

OFFICE OF FEDERAL PROCUREMENT POLICY

A GUIDE FOR WRITING AND ADMINISTERING PERFORMANCE TOLERANCES OF WORK FOR SERVICE CONTRACTS

OCTOBER 1980

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OFFICE OF FEDERAL PROCUREMENT POLICY

A GUIDE FOR WRITING AND ADMINISTERING PERFORMANCE STATEMENTS OF WORK FOR SERVICE CONTRACTS

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Acknowledgement

This document is an outgrowth of concepts and ideas developed by the Air Force Logistics Management Center, Gunter AFS, Alabama. Principal participants in the program were Kenneth Gerken, Laurence Nolte, and David Muzio. This team tested and refined the ideas in a broad cross section of service contracts, both overseas and in the continental United States. Under the leadership of Darleen Druyun, the program was accepted for Air Force-wide implementation and has proven itself as an excellent method to ensure that the Government clearly states its requirements and receives full value for money paid.

Recommendations for improving the pamphlet are solicited and should be forwarded to the Associate Administrator for Major System Acquisitions and Procurement Strategies, Office of Federal Procurement Policy, 726 Jackson Place, N. W., Washington, D. C. 20503.



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SERVICE CONTRACTS

This document describes a systematic means for developing statements of work and quality assurance surveillance plans. It describes how to write and use these documents. It tells how to write performance into statements of work and implements policy concerning contracting out for services. It is written for mid-level managers who write the documents and for contracting personnel who review and administer service contracts. Parts of it apply to quality assurance evaluators who use these documents.

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CHAPTER 1

GENERAL AND INTRODUCTION

1-1. New Role of Contractors. Each year the government contracts for a large part of its mission support. As a result, civilian contractors have assumed a major role in day-to-day operations in the area of services. Contractors do such work as transportation, refuse collection, food services, and janitorial services. At some places they provide an entire support function, including engineering and supply.

a. Whenever the government contracts out a job, it is entitled to receive quality service. So that the government can define and measure quality, this document presents a method of identifying and stating requirements in such a way that the statement of work (SOW) will state accurately our minimum requirements. It also explains how to assure that the contractor has actually performed the services required.

b. This document is also designed to show non-contracting personnel how to write a SOW and a Quality Assurance (QA) surveillance plan for service contracts. It explains how contract administration personnel should take action based on surveillance results. (The example used is a service contract for vehicle operations and maintenance but, the method can be used for other service contracts, including total support contracts.)

c. The new technique used in this document is called job analysis. Its use results in performance oriented statements of work that describe the desired services and their quality. This document and its procedures are designed for use by managers and technical persons responsible for the area to be contracted.

1-2. Terms Explained. Following are terms used frequently in this document.

a. Acceptable Quality Level. The maximum percent defective, the maximum number of defects per hundred units, or the number of defects in a lot that can be considered satisfactory on the average. The allowable leeway or variance from a standard before the government will reject the specific service. And AQL does not say that the contractor may knowingly offer defective service. It implies that the government recognizes that defective performance sometimes happens unintentionally. As long as the percent of

defective performance does not exceed the AQL, the service will not be rejected by the government. The contractor, however, must reperform the defective service when possible.

b. Acceptance Sampling. A form of sampling used to determine a course of action. A procedure that gives a specified risk of accepting lots of given quality.

c. Activity. Another name for a work process. (An activity uses inputs and generates outputs.)

d. Administer. That stage of the contracting cycle in which the contracting officer insures that the total contract is being followed, makes necessary changes to the contract, and insures progress toward contract completion.

e. Analyst. A non-Contracting person charged with developing a SOW and a QA surveillance plan; also, the person who analyzes a function to develop the required documents.

f. Attribute. The property a unit has of being either bad or good. That is, the quality characteristic of a unit is either within the specified requirements or it is not.

g. Attribute Sampling. A form of acceptance sampling that grades a service as defective or non-defective.

h. Buy. That stage of the contracting cycle in which bids are analyzed, the proposed contractor is determined capable to perform the contract, and award made to the successful contractor.

i. Define. That stage of the contracting cycle in which the customer states what he or she wants contracted. This stage includes funding the requirement, writing the SOW and writing the surveillance plan.

j. Input. Anything put into a system or process or expended in its operation to achieve a result or output.

k. Interface. A common boundary between two organizations or activities.

l. Job Analysis. The act of looking at a job as it is being done in-house or a contractor to determine what actually results. Job analysis looks at organization, workload, performance values, and resources.

m. Lot. A collection of service outputs from which a sample is to be drawn and inspected to determine conformance with the standard.

n. Lot Size. The number of service outputs in a lot.

o. Organizational Analysis. The act of looking at an organization to determine what kind of services it provides.

p. Output. The amount of something produced by a system or process during a given span of time.

q. Percent of Sample Found Defective. Determined by dividing the number of defects by the sample size when the reject number has been equalled or exceeded. The resulting number is used to make an equitable deduction from the contract price for non-performance by the contractor.

r. Performance Indicator. A characteristic of an output of a work process that can be measured.

s. Performance Value. A composite of a standard and an acceptable quality level which describes the quality of an output of a work process.

t. Qualify. That stage of the contracting cycle in which one determines that the contractor's work satisfies the requirements of the SOW.

u. Quality Assurance. Those actions taken by the government to check goods or services to determine that they meet the requirements of the SOW.

v. Quality Assurance Evaluator (QAE). That person responsible for checking contractor performance.

w. Quality Control. Those actions taken by a contractor to control the production of goods or services so that they will meet the requirements of the SOW.

x. Random Number Table. A table of numbers arranged in a random fashion. A table used to make random samples.

y. Random Sample. A sampling method whereby each service output in a lot has an equal chance of being selected.

z. Random Sampling. A method of looking at a few individual items in a lot to determine the quality of that lot against a standard.

aa. Release. That stage of the contracting cycle in which goods and services are accepted as meeting contract requirements and payment is made to the contractor.

ab. Reliable Service. A service that is dependable and is provided when required.

ac. Sample. A sample consists of one or more service outputs drawn from a lot, the outputs being chosen at random. The number of outputs in the sample is the sample size.

ad. Sampling Guide. The part of the surveillance plan which contains all the information needed to perform a random sample.

ae. Sampling Plan. A plan which indicates the AQL, the number of units from each lot which are to be inspected (sample size) and the criteria for determining the acceptability of the lot (acceptance and rejection numbers). Used to develop the sampling guide.

af. Service. A job performed to the standard and within the acceptable quality level. The contractor must do the specific job, and meet the standard, and meet the acceptable quality level before one can say that performance has been acceptable and that he/she should be paid.

ag. Source. That stage of the contracting cycle in which the contracting office prepares the bid package, finds potential contractors to do the work, and accepts bids from proposed contractors.

ah. Standard. An acknowledged measure of comparison.

ai. Statement of Work. A document that describes accurately the essential and technical requirements for items, materials, or services including the standards used to determine whether the requirements have been met.

aj. Surveillance Plan. An organized written document used for quality assurance surveillance. The document contains sampling guides, checklists, and decision tables.

ak. System. A group of interacting, interrelated, or interdependent elements forming a collective entity.

al. Tree Diagram. A visual representation of the major functions performed by a system which shows logical parts and subparts.

am. Uniform Service. A service that is, within defined limits, always the same.

an. Work. A series of actions, changes, or functions that bring about an end result.

1-3. Government Policy. The government policy in service contracting is as follows:

a. The performance oriented statement of work (SOW) for a service contract includes the standards of performance and acceptable quality levels.

b. Standards must be measurable.

c. Quality control is a contractor responsibility.

d. A performance oriented SOW must not contain detailed procedures unless absolutely necessary. Rely on a statement of the required service as an end product.

e. References to directives in the SOW should be held to a minimum.

f. The surveillance plans described in this document are an acceptable way of performing quality assurance.

g. The most qualified persons available must write the SOW and the surveillance plan. Standardized government documents, when available, will provide valuable basic information.

1-4. A Systems Approach. The design of a SOW and the surveillance plan is based on a systematic analysis of the function to be put under contract or already under contract. The procedure for deriving these two products is called job analysis. The procedure consists of a step-by-step review of the requirement to arrive at the specific output services and associated standards.

a. Jobs as Systems. The analysis assumes that an operation is a system. An operation can be called a system because it consists of a job or a combination of jobs carried out by people, and sometimes, machines for a certain purpose. The parts of a system are usually called input, work, output, and control loops. These parts are shown in figure 1-1.

(1) From a contractor's view, the system consists of taking people, facilities, material, and the SOW and inputting it into a work process. The result of this work is a contract output.

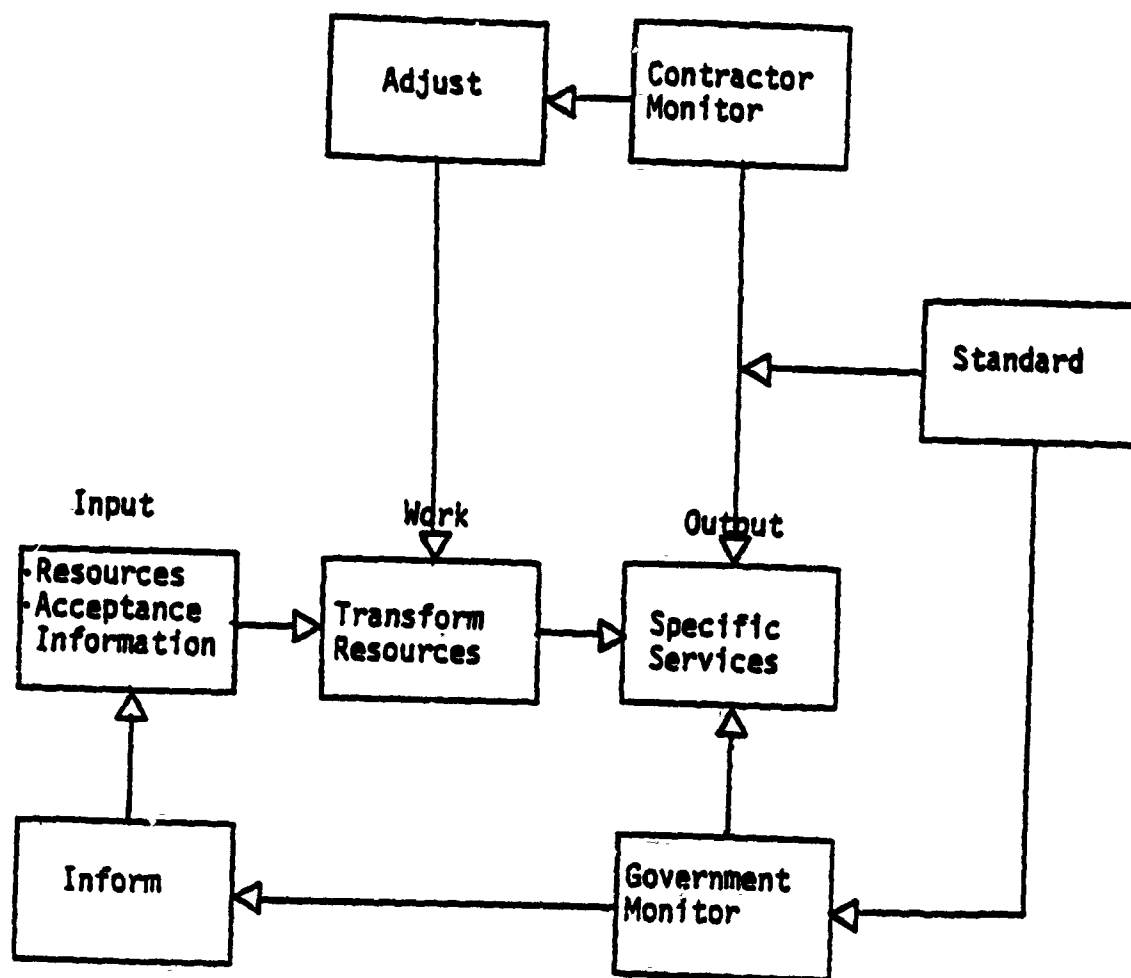


Figure 1-1. Contractor Operated System.

(2) Two major control loops are at work in this system. Both loops use standards as the basis for determining acceptability.

(3) The contractor quality loop feeds back information from the output into the work process so that the contractor can adjust performance to meet the standard specified.

(4) On the other hand, government quality assurance looks at the output and determines its acceptability. This information then becomes an input for contractor management to adjust the quality control function.

b. Parts and Subparts. Every service contract operation can be viewed as a system. Further, each major system can be broken into small parts or subsystems. For example, if the system portrayed in figure 1-1 were called transportation, the major system could be broken into small parts called vehicle operations, vehicle maintenance, and traffic management. Further, each of these parts could be broken down into the smaller parts or subparts that make up that part, as shown in figure 1-2.

(1) Note that the transportation work area leads to vehicle operations, which leads to vehicle dispatch, which leads to taxi dispatch and U-drive dispatch. Each work area has its own set of inputs and outputs. This chart does not contain all of the work areas associated with transportation. Rather, it only shows an example of how a system can be broken into its parts.

(2) The chart looks a great deal like a standard organizational chart, except that this chart shows each thing that happens rather than who performs the task. Further, by showing an input, it shows what must be there for something to take place. It shows that each job must have an output that can be measured in some way.

c. Results of the Systems Approach. A proposed contract effort must be viewed in a systematic way to arrive at an output or performance-oriented SOW and a means of measuring the service. Thus, a systematic approach to analysis will result in an enforceable, clear SOW. It will also produce a quality assurance surveillance plan that tells the government if the service is provided as specified. Further, the systems approach permits the analyst to identify outputs and separate them from the specific procedures required to create the outputs.

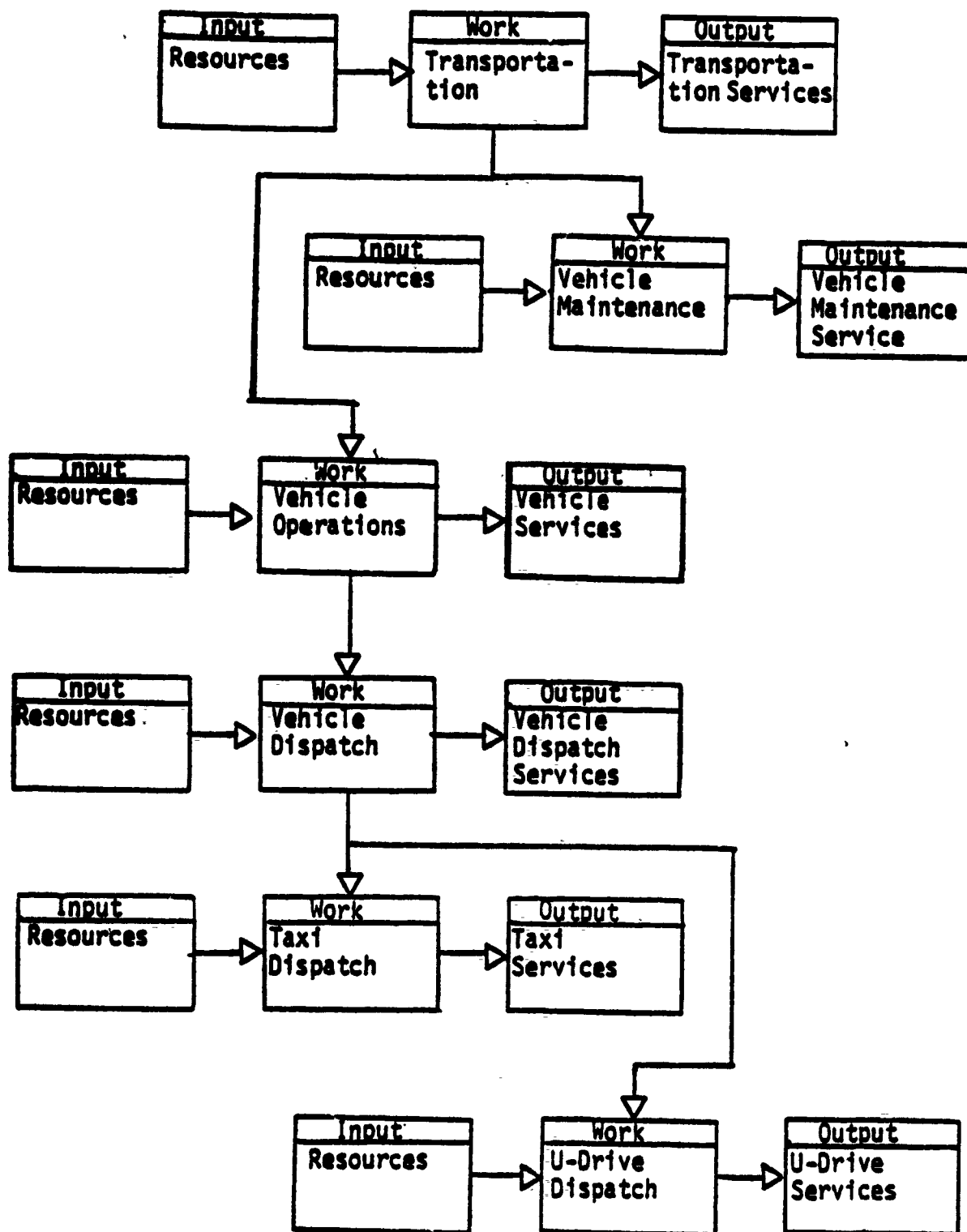


Figure 1-2. Transportation (Partial).

(1) When the government specifies a given procedure, it assumes responsibility for insuring that the design or procedure will result in the desired output. On the other hand, if it specifies the output performance and its quality standard, the contractor must then use the best management to achieve that level of performance.

(2) Last, systematic analysis gives a clear picture of what input is needed to get the job done. This data is most useful in analyzing a contract bid price, conducting a preaward survey, creating a list of government furnished property, and making payment deductions in case of non-performance.

1-5. Team Approach. The development of a quality SOW is a result of team effort. The leading members of the team are the functional office, the local contracting office, and the manpower/management engineering office. The latter can provide previous manpower studies to assist in determining jobs performed.

a. Responsibilities. During the contracting cycle, responsibilities are assigned as shown in figure 1-3. This chart shows which major functions occur during the contracting cycle and which important actions take place during each function. The columns on the right show who is responsible at each stage of the purchase cycle.

(1) The functional area chief should be considered the team leader exercising authority and responsibility for the function that will be under contract. Functional persons state the service that will be delivered, measure the quality of service, and accept the service.

(2) The contracting office is the means of getting a contract and enforcing its provisions.

(3) The contracting office also provides the necessary authority and technical experience in contracting to make the contract a workable document.

(4) The manpower/management engineering office performs cost studies required by OMB Circular A-76.

b. Relationship in Contracting Out. The lines of authority and responsibility that exist when a function is contracted out, are shown in figure 1-4.

(1) When a given function is performed in-house, with government personnel, the line of authority flows from

Functions and Actions	Functional Area Chief	Manpower/ Management Engineer	Contracting Office
Define	////////////////////////////////////		
Prepare SOW	Responsible	Assist	Assist
Prepare Surveillance Plan	Responsible	Assist	Assist
Perform Cost Study	Assist	Responsible	Assist
Source	////////////////////////////////////		
Develop Sources	Assist		Responsible
Prepare Solicitation	Assist		Responsible
Conduct Prebid Conference	Assist		Responsible
Buy	////////////////////////////////////		
Analyze Bids	Assist	Assist	Responsible
Conduct Preaward Survey	Assist		Responsible
Award Contract	Assist		Responsible
Qualify	////////////////////////////////////		
Surveillance of SOW	Responsible		Assist
Request Modifications	Responsible	Assist	Assist
Administer	////////////////////////////////////		
Make Modifications	Assist		Responsible
Non-SOW Surveillance	Assist		Responsible
Conduct Progress Meetings	Assist		Responsible
Release	////////////////////////////////////		
Inspection	Responsible		Assist
Acceptance	Responsible		Assist

Figure 1-3. Responsibilities.

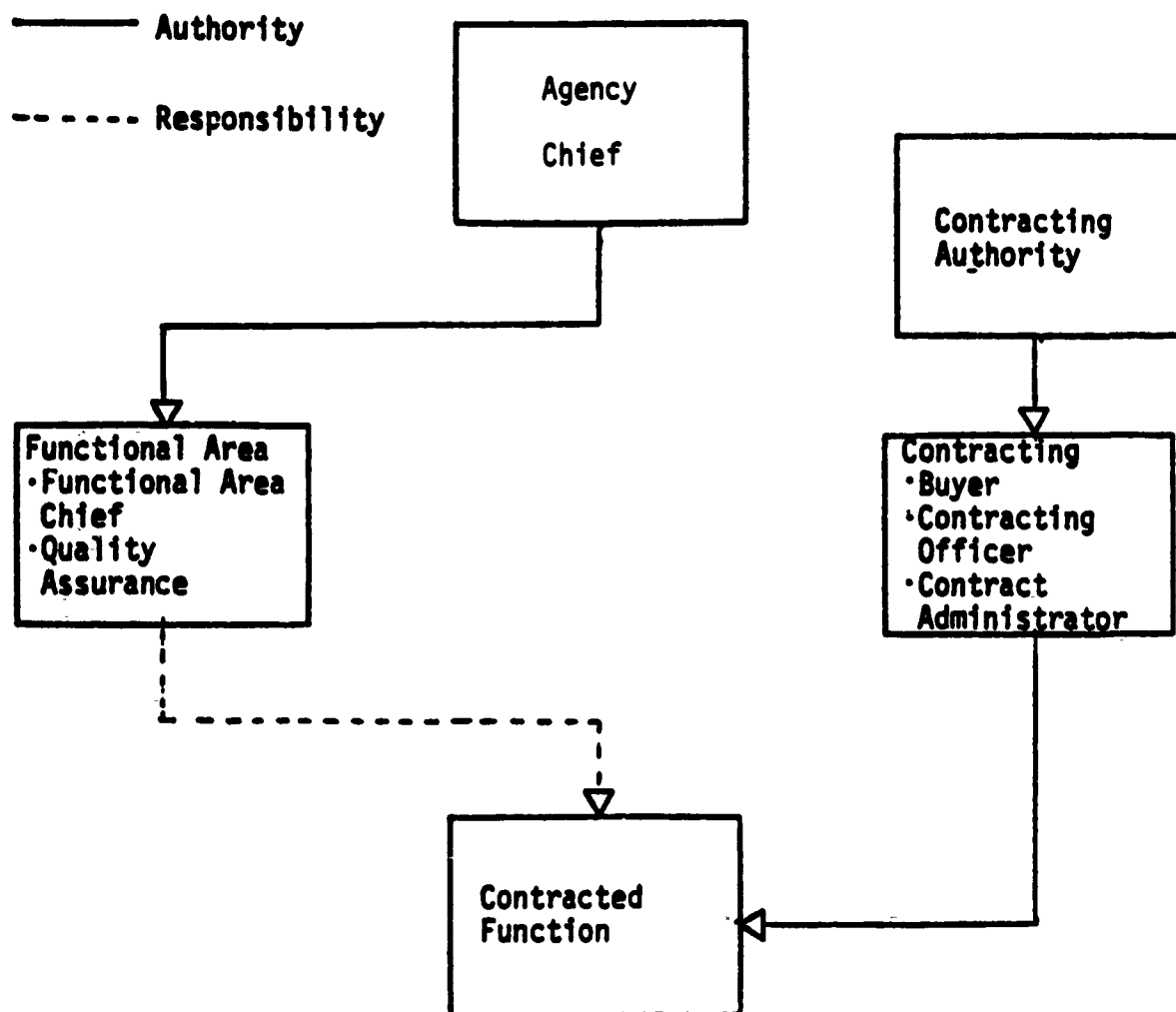


Figure 1-4. Relationships in Contracting.

the agency chief, to the functional area chief, and then to the function. However, when authority is delegated in the contract environment, the contracting office (and especially, the contracting officer) become a part of the authority line.

(2) By law, only a contracting officer may make a contract and may direct a contractor. Hence, the functional area chief must act through the contracting officer to obtain and manage a service contract.

(3) In a contract function, responsibility does not follow the line of authority. Rather, the functional area chief has overall responsibility to see that the service is provided but works through the contracting officer's authority. Two major tools for that use are a well-defined quality SOW and a surveillance plan.

1-6. Overview of the Method for Developing a Performance SOW and Surveillance Plan. The method and the relationship of the tasks are shown in figure 1-5 and described below. Succeeding chapters explain in detail how to accomplish each step or task in the method.

a. Job Analysis. In this phase, the analyst starts with information on how the job is being done and ends with the performance that will be required of a contractor. The analysis consists of these steps:

(1) Do Organizational Analysis. First, the analyst reviews the current organization and identifies the services it provides.

(2) Prepare Tree Diagram. A tree diagram breaks a job into smaller and smaller parts. Each part brings about a final result or service.

(3) Do Work Analysis. Take each part of the tree diagram and break it into input, work, and output. Input is what is needed to do the job, work is what steps are needed to do the job, output is what the work produces. During this step the analyst decides, with management, what outputs the contractor will provide and what work will remain in-house.

(4) Gather Data. After the analyst has picked the services on the tree diagram that are to be contractor supplied, data can be gathered. In this step, the analyst collects data on how much input is required to do the job, and how often the output is provided.

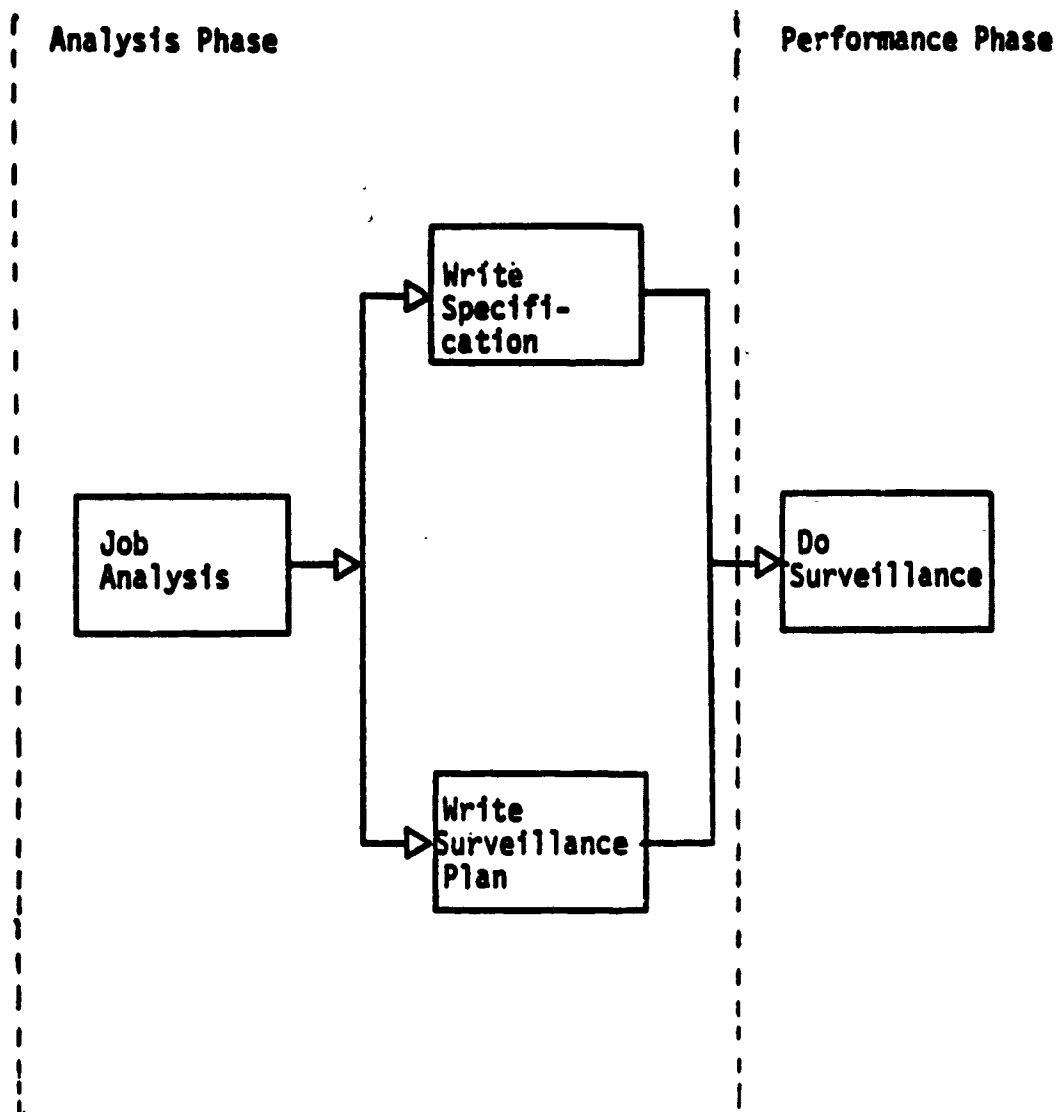


Figure 1-5. Overview of Analysis Steps.

(5) Do Performance Analysis. Each service proposed for contract has a performance value assigned. The analyst decides how the service can be measured. With management, the analyst determines what standards apply. With management, an acceptable quality level is applied.

(6) Analyze Directives. During this step the analyst decides what directives, if any, apply to the service to be provided. Directives are classified as mandatory or advisory. They must be held to a minimum.

(7) Deduct Analysis. During this step the analyst works with the manpower/management engineering office to prepare the estimated contractor cost of each specific service. These costs are stated in the SOW as a percentage of total contract cost, for a formally advertised procurement. These costs are used as the basis for deductions for non-performance; in a negotiated procurement, they are used to evaluate contractor proposals. Actual negotiated costs are included in the SOW.

b. Write the SOW. The previous steps in job analysis are carried out for the dual purpose of writing a SOW and a surveillance plan.

(1) If job analysis has been done properly, the concurrent writing task should be relatively easy. Concurrency means that neither task is truly independent; what is written into the SOW influences what is put into the surveillance plan. Likewise, the surveillance plan will force the writer to make sure that outputs and procedures in the SOW are measureable.

(2) Writing the SOW consists of:

(a) Expressing the contract-desired output in clear, simple, concise, and legally enforceable terms. In determining what level of detail to include in the SOW, the analyst must consider whether to quote from a mandatory regulation or to refer to it.

(b) Using a format that presents the specified tasks in an easily understood manner. (See explanation in Chapter 3)

(c) Determining what exhibits will help convey to the contractor the job that needs to be done.

c. Writing a Surveillance Plan. The surveillance plan is a document used to make sure that systematic quality

assurance methods are used. It assumes that the contractor is responsible for managing and controlling the output of service. The government plan seeks to determine if contractor-provided service meets the quantity and quality standards. The development of the plan involves these major steps:

(1) Identifying Key Performance Indicators. The job analysis phase identified many performance indicators. Not all of these indicators are critical to the service being provided. During this step the analyst must decide which indicators to include in the plan, using as criteria, the criticality of the process and its output, the availability of quality assurance manpower, and the adaptability of each indicator to overlap and check many kinds of outputs.

(2) Identify Information Sources. Each plan uses many sources of information (for example, existing management information systems, customer complaints, and random sampling).

(3) Develop Tools. The writer of the surveillance plan has many tools. These tools are:

(a) The Sampling Guide. The sampling guide is a written procedure which states what will be checked, the standard of performance, and how the checking will be done. (for a sample guide, see Chapter 4). The sampling guides used in this regulation are based on statistical techniques called for in Military Standard 105D, Sampling Procedures and Tables for Inspection by Attributes. By sampling a small part of the total service in a random fashion, the QAE can accept or reject the service, based on the standard.

(b) Decision Tables. When a service is rejected, a decision must be made as to who is at fault (the contractor or the government). A decision table is used for this purpose. The decision table identifies different kinds of unsatisfactory performance, probable cause factors, and the things from which these factors could result.

(c) Checklist. The last tool is the checklist. Checklists are used to record what has been checked by a sampling guide and to record information on contract items not covered by sampling.

d. Do Surveillance. The final step is doing surveillance, that is, taking the written surveillance plan and using it on a daily basis. In this step, random samples are drawn and schedules of quality assurance inspections made. Contractor discrepancies are documented and corrective action taken. If appropriate, money is deducted from a contractor's payment by the contracting officer.

CHAPTER 2

JOB ANALYSIS

2-1. Advantages of Job Analysis. The previous chapter outlined the steps involved in developing a statement of work (SOW) and a quality assurance surveillance plan. This chapter explains job analysis in greater detail. This process enables the analyst to pull together all of the essential information needed to write a performance-oriented SOW. It also helps to build a foundation that will help the government determine the quality of the contractor's output service. The steps in job analysis are described below.

2-2. Organization. The starting point in looking at a service function is to see how it is organized and what kind of service it provides. This is not to say that the SOW will require that a contractor adopt the government style of organization. Rather, organizational analysis will provide a framework for determining what is done by the organization.

a. To capture this data, use an organizational analysis sheet as shown in figure 2-1. The data gathered and placed on the analysis sheet will show a complete picture of the organization. Of particular importance is the choice of services performed.

b. These services or outputs become the basis for writing the SOW, development of standards, defining performance indicators, and identifying acceptable quality levels of performance. Be as specific as possible when making the entries.

2-3. Tree Diagram. After doing the organizational analysis to find out what kind of services the organization provides, the analyst must now link the services together in a logical flow of activities. The major tool used is the tree diagram.

a. An example of a tree diagram for vehicle operations is shown in figure 2-2. As shown in the figure, the top box states the overall function (in this case, to operate and manage vehicles). Each of the following levels breaks the job into parts and subparts, to develop a chart that fully describes the job in terms of these parts.

b. The boxes are numbered to show the relationship of the parts back to the higher level part. For example, test is numbered "3.1", because it relates to train and qualify vehicle operators which is numbered, "3". These

Name of Organization: Transportation	
Mission Statement: Provides vehicle maintenance, on base vehicular transportation, shipment of household goods, etc.	
Organizational Elements:	
	Traffic Management Office Vehicle Maintenance Vehicle Operations Reports and Analysis
Services Performed:	<ul style="list-style-type: none"> • Normal Taxi Service, U-Drive Service, Emergency Maintenance, Outbound Personal Property Service....etc. • Contingent Vehicle support for disaster control exercises....etc.

Figure 2-1. Organizational Analysis.

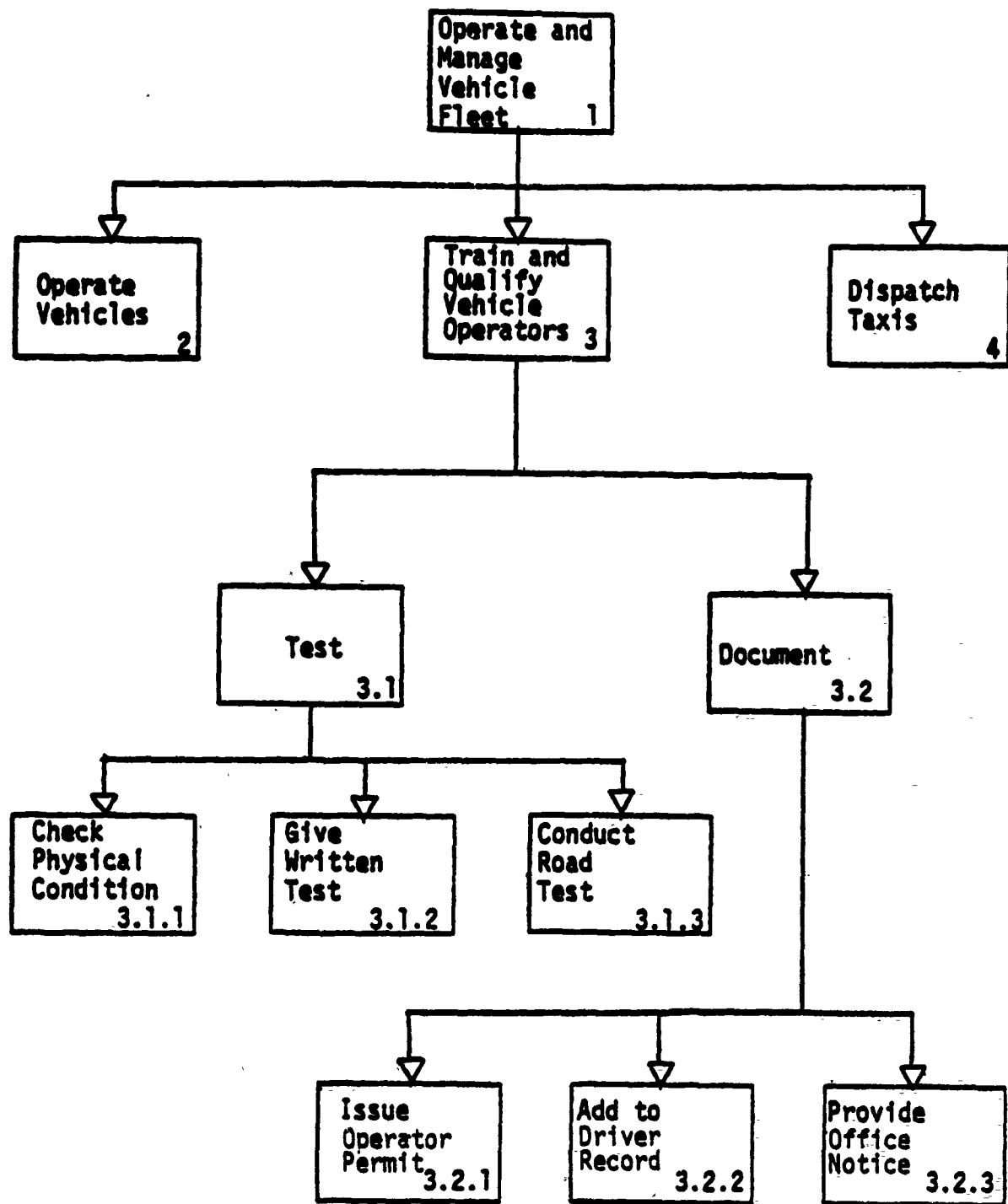


Figure 2-2. Tree Diagram.

numbers and part boxes provide the start for further analysis.

2-4. Activity Analysis. Prepare a separate activity analysis for each numbered box in the tree diagram. These sheets are used to define the outputs of the process. An example of an activity analysis for dispatching taxis is shown in figure 2-3.

a. The analysis consists of three major sections: input, work and output.

(1) The steps in the work section that are required to perform the work are numbered in sequence.

(2) The input section lists those things that are needed to perform the work steps.

(3) The output section contains those things produced by the work (that is, items or services that the work provides).

b. In the example, the taxi dispatch begins with the input of a request for taxi service, and with documenting the service. The output of the process is a documented form and the movement of the passenger to the desired location.

c. The analyst must complete the analysis in as much detail as is possible. If the tree diagram has been branched out in enough detail (that is, as many sub-parts as possible) the task will be very easy. The analysis does nothing more than state what starts a job, what takes place when a job is done, and the results of the job -- that is, input, work, output. The analysis merely puts this thinking down on paper in a step-by-step fashion.

2-5. Classification. By building the tree diagram and the activity analysis, the analyst knows a great deal about the job. The analyst must now work with management to decide what jobs will be targeted for inclusion in the SOW. For example, the government may decide to retain responsibility for the analysis section in a transportation contract. No further job analysis need be done to jobs not targeted for contract. Decisions reached in this step are recorded on the activity analysis sheets (see figure 2-3). Record the decision for each entry in the output block.

2-6. Data Gathering. After the analyst has identified the services to be provided under contract, workload and resource data must be gathered. The procedure for this is simple.

Activity: Dispatch

Service Number: 5

Input	Work	Output	Include in Contract?	
			Yes	No
Taxi Service Request - Telephone - Walk-in - Written	1. Determine Request Validity 2. Document Taxi Request 3. Update Taxi Request 4. Dispatch Taxi 5. Pickup Passenger 6. Deliver Passenger 7. Complete Form "Request for Motor Vehicle Services"	Form - Request for Vehicle Services Pending		
		Form - In-work		
		Passenger Movement Filed Form		

Figure 2-3. Activity Analysis.

a. Workload. As used here, "workload" refers to the result of the data gathering task which gets information on how often output services are provided. After the jobs and output services are analyzed, it should be much easier to gather the required data. As a rule, this information is available from existing management information systems, but it may need to be restructured, so that it is accumulated by a specific output.

(1) The analyst must find out how often a service will be provided during the proposed contract period. Use historical information, plus projected changes, to estimate the service frequency. To gather this data, put it on a sheet as shown in figure 2-4. This sheet shows what service will be provided, and helps in estimating future requirements to be used in sizing the contract effort.

(2) This data will have eventual use in structuring the government estimate and in analyzing the proposed contractor's bid price. This frequency information is also given to bidders so that they understand the true requirements that will have to be met under the contract. Further, workload data is used in building the surveillance plan.

b. Resources. To provide a service, a job requires the use of physical resources (assets and personnel).

(1) Physical Assets: To write a SOW, gather data about the physical assets required to perform a contract. Gather data concerning physical assets at the specific service output level. (For example, gather data on what physical assets are needed to perform emergency repair service.) Sheets as shown in figures 2-5, 2-6, and 2-7 should be used to gather data on the facilities, materiel, and equipment that will be provided to the contractor. Since the SOW must list the assets the government provides, take care to avoid listing items that will not be available for the contractor's use. The list must show any assets that will be added or deleted during the life of the contract.

(2) Personnel. Data on personnel must also be gathered. For example, a sheet as shown in figure 2-8 can be used for this purpose. Data for this sheet are available from manpower documents on the organization, but the data may need to be restructured to break it out for the specific services provided. For example, a manpower document might show how many people and what skill levels are authorized to operate a vehicles, but not how many people are allocated to perform the vehicle dispatch service. The analyst must

Workload			
Service	Historical Workload	Known Change	Estimated Workload
Taxi	1200/month	-10%	1080/month
U-Drive	50/month	+20%	60/month

Figure 2-4. Workload Analysis.

Service: Vehicle Repair		Facility
Facility	Square Feet	Location
Bldg 209	2000	Maxwell AFB
Bldg 1024	1500	Gunter AFS

Figure 2-5. Facility Analysis.

Service: Vehicle Repair		Material
Name	Stock Number	Quantity
None Supplied to Contractor		

Figure 2-6. Material Analysis.

Service: Vehicle Repair		Equipment		
Name	Stock Number	Serial Number	Location	Quantity
Flat Top Desk	7110-00-270-9840		Vehicle Operations	2
Training Aid-Driver	6930-00-526-3639	MF270S98	Driver Training	1

Figure 2-7. Equipment Worksheet.

Personnel			
Service	Authorized Grade	Number	Security Clearance Required
Vehicle Dispatch	WB-5	1	No
	WB-4	1	No
	WB-3	4	No
Taxi Service	WB-5	1	No
	WB-3	6	No

Figure 2-8. Personnel Analysis.

extract this data to complete the data analysis (that is, how many government persons would be required if the service remained in-house).

2-7. Performance Value. When the government performs a service for itself, it not only generates an output, but it produces that output to meet standards to some acceptable quality level.

a. Example. Let us assume that a taxi pickup is to be provided within four (4) minutes of an agreed upon pickup time ninety percent (90%) of the time (10% error rate). Taxi pickup is the service, four minutes is the standard, and 10 percent is the acceptable quality level.

b. Minimum Requirements. By law, the SOW must present the actual minimum requirements of the government. Hence, the analyst must avoid demanding more of a contractor than the government would provide if it were performing the service.

c. Performance Output. Performance values enable the analyst to place realistic demands on contractor performance. By the same token, performance values permit the writing of a performance-oriented SOW and eases the development of a quality assurance surveillance plan, for example, see the performance value analysis in figure 2-9. In doing the analysis, the analyst must include each of the output services identified for inclusion in the contract during classification.

d. Standards. In the appropriate box, show the standards that pertain to the services. These standards can be derived from the directives regulating the service, from agency standards, or from work location standards.

e. Measuring Quality. Finally, each service must have an acceptable quality level. This entry can be based on historical records, a poll of managerial desires, or agency imposed acceptable quality levels. An acceptable quality level should rarely be 0 percent, for this indicates perfect performance which is very expensive and nearly impossible to achieve. Acceptable quality levels must equal but not exceed the standards met when the government provides the services in-house, that is, how well the government did the job. However, it must be recognized that some quality levels are purely judgemental, such as appearance, taste, etc.

f. Assigning Values. Performance values need not be assigned for outputs that relate strictly to internal

Activity: Taxi Operation

Performance Indicator	Standard	Acceptable Quality Level
Response Time	4 minutes	5%
Accidents Per Mile	0	0%
Operational Cost Per Mile	\$0.14	20%
Taxi In-Commission Rate	80%	10%

Figure 2-9. Performance Value Analysis.

contractor management. For example, work scheduling is required to get the job done; however, the government is interested only in getting the job done, and is not generally concerned with how. The stress is on performance, not procedure. Hence, there is normally no need to assign a performance value to work scheduling. The meaning of each entry is described below.

g. Performance Indicator. A performance indicator is a characteristic of an output that can be measured. It may measure quantity as well as quality. By using a performance indicator and its associated standard, one can know if a process is producing a quality output. (For example, the major output of taxi operations is passenger movement.)

(1) The question must be asked as to what will allow one to measure how well the process generates that output. To do this the analyst must review each previously identified job to see what measures can be associated with it.

(2) The measures are usually stated as rates (that is, a means of expressing something as it relates to a fixed amount of something else). For example, a rate for taxi service is the cost to run the fleet per mile. The performance indicators that relate to taxi operation are shown in figure 2-9. All of these indicators are rates, except average response time. However, response time is something that can be measured.

(3) In many cases, agency directives specify the performance indicators that will be used to evaluate the process. If the indicators are not prescribed, the analyst must work with management to decide what indicators would help to measure the process. Rates in terms of time and distance and accuracy are particularly useful for this purpose.

(4) The analyst must be careful to choose performance indicators that are realistic. The grams of dust per square centimeter on a vehicle may be a measurable performance indicator for vehicle condition, but it is not a realistic indicator for general use. The analyst may have to use a less satisfactory indicator (such as times washed per month). Or one may have to resort to an even less satisfactory measure (such as cleanliness) which calls for an individual judgment on the part of the person measuring performance.

(5) Wherever possible, however, one must choose a performance indicator that measures the service by a number (that is, quantifies it).

h. Using Standards. A standard is something against which another thing can be measured. Nearly everyone is familiar with standards of some sort. For example, the standard operating speed for automobiles on highways is 55 miles per hour. In this case the number 55 is the standard, while miles per hour is the performance indicator.

(1) In looking at the processes and the performance indicators chosen, one must ask what kind of yardstick will be used to measure the process. In some cases the yardstick or standard is provided by agency authorities.

(a) The standard for average taxi response time of 4 minutes is an example. However, there is no standard for bus service.

(b) In this case, the analyst, with management's help, will have to find a reasonable standard that bears some relation to the criticality of the service to be provided and how well the government does the job in-house.

(2) A standard for bus service could be stated in terms of timeliness of arrival at a bus stop. Thus, the standard for bus service would be stated: depart the stop no earlier than scheduled time nor later than scheduled time plus five minutes. An example of the taxi service job and the standard for the performance indicator is shown in figure 2-9.

i. Acceptable Quality Level. The acceptable quality level of a standard tells what variation from the standard (that is, error rate) is allowed. It is used to measure the reliability of the output generating process.

(1) An acceptable quality level is generally used in referring to a production line that produces a tangible object. These products can then be measured to see if they meet the standard within an acceptable quality level.

(2) Service contracts also produce measurable services (even though they are not always tangible) and one can determine how often they meet the standard.

(3) An acceptable quality level is expressed in terms of a percentage of allowable error in a time period. Using the performance indicator with its associated standard, the analyst determines what error rate should be allowed, based on agency directives, historical records of how well the government provided the service, or they can be established by management decision.

(4) Whatever the source of the entry, the analyst must question whether the acceptable quality level is realistic and represents how well the service must be provided under contract. The example of acceptable quality levels shown in figure 2-9 summarizes all the performance information that is generated by job analysis. Charts like this are critical for all further decisions about the SOW and the surveillance plan.

(5) After these charts are filled in, the analyst must cross out the indicators that apply to contractor internal management. What remains will be the performance indicators, standards, and tolerances (acceptable quality level) that tell how well the contractor must provide the output service. In the example in figure 2-9 all values would be eliminated except average response time. All other items under a firm fixed price vehicle operations and maintenance contract relate strictly to internal contractor management indicators.

2-8. Governing Directives. For each of the services to be provided under contract, the following steps are done:

a. Catalogue. The analyst needs to catalogue all the manuals, regulations, and other higher government, agency and local level guidance that pertain to the services. (These documents often refer to other regulations, manuals or technical orders which must also be listed.) The list that results should be arranged similar to figure 2-10. List the title and the date of publication. If only parts of the directive apply, note these parts in the directive column. If the directive has been mentioned in a document previously listed, cite that document in the "REFERENCED IN" column. This data will be needed later in deciding whether a directive or part of a directive applies to the proposed contract effort.

b. Applicability. Each service ordinarily has its basis in some governing directive that tells how the job is to be done, in varying degrees of detail, when it is performed in-house. In other words, directives often specify procedures.

(1) At this point, the analyst must decide whether those procedures are to be mandatory on the contractor (that is, whether to require the contractor to do the job the same way the government would do it). To do this, the analyst reviews the list of directives and checks the proper box on the sheet to show whether each directive will be mandatory or advisory upon the contractor.

Governing Directives					
Directive	Title	Date	Referenced In	Mandatory	
				Yes	No
AFM 77-310	Motor Vehicle Management	20 July 78	AFM 77-310, Vol II		
T.O.00-208-5	Vehicle and Base Support Equipment Inspection and Administration	15 Mar 74			

Figure 2-10. Governing Directives Analysis.

(2) When only parts of directives appear to be mandatory, the analyst must decide either to reference that part of the directive, or extract the information and place it in the SOW as a procedure. If there is no clear directive, the analyst must decide if a procedure is required or if simply stating the activity and its performance value is sufficient.

(3) As a rule, procedures and directives must not be specified. Reliance must be placed on stating the desired output with a performance value. If a regulation is mandatory, reference it only when it is too bulky to extract and include in the SOW in full text.

2-9. Deduct Analysis. Standard clauses in service contracts allow the government to deduct payment in case of non-performance. In short, if the government doesn't receive the service, the contractor does not get paid. The hard question is how much to deduct.

a. Methodology. The amount deducted must represent as nearly as possible the cost of the service foregone.

(1) The information is used to arrive at a figure for each service which tells what percentage it is of the whole service.

(2) The source of information is the personnel data and the specific service outputs derived during job analysis. How to determine the percent value of a specific service is explained below.

(3) Note that other resources and overhead have not been used to determine costs. Since the contractor automatically spreads these costs in a bid, there is no need to use them in these figures.

b. Finding the Specific Service. To obtain a list of services refer to the tree diagram. When the tree diagram was made, the overall job was broken into smaller and smaller parts. For example, transportation has as parts vehicle operations, vehicle maintenance, analysis and traffic management. Vehicle operations, in turn, breaks into many smaller parts, as illustrated in figure 2-2. The information on the tree diagram is used to begin making the deduct analysis (see figure 2-11).

c. Personnel. The next step in filling out the deduct sheet is personnel. The personnel analysis made during data gathering for resources has the data on how many people are required to provide a specific service.

Job: Vehicle Operations	Personnel	Payroll Cost Per Month	% Of Total
Operate Vehicles	XXXXXX	XXXXX	XXXXXX
Operate Taxi.....	5	\$5000	19.2 %
Operate Scheduled Bus.....	4	\$4000	15.4 %
Operate Unscheduled Bus.....	1	\$1000	3.8 %
Train/Qualify Vehicle Operators	XXXXXX	XXXXX	XXXXXX
Test.....	XXXXXX	XXXXX	XXVXXX
Check Physical Condition.....	1	\$1000	3.8 %
Give Written Test.....	1	\$1000	3.8 %
Conduct Road Test.....	1	\$1000	3.8 %
Document.....	XXXXXX	XXXXX	XXXXXX
Issue SF 46.....	.3	\$ 360	1.4 %
Add to DD Form 1360.....	.3	\$ 360	1.4 %
Provide Unit Notice.....	.1	\$ 100	0.4 %
Manage Credit Card Issuance Use....	XXXXXX	XXXXX	XXXXXX
Issue Cards.....	.2	\$ 240	0.9 %
Process Receipts.....	.2	\$ 240	0.9 %
Dispatch Vehicles.....	1	\$1000	3.8 %
(etc.)	(etc.)	(etc.)	(etc.)
(etc.)	(etc.)	(etc.)	(etc.)
TOTAL	28	\$26,000	100 %

Figure 2-11. Deduct Analysis.

(1) The analyst must adjust this data to reflect decisions made about standards and acceptable quality levels.

(2) The personnel data may have to be adjusted upwards or downwards, since standards and acceptable quality levels directly affect the number of persons required to do the job. Further, since this data represents the in-house cost of performing the services in the SOW, the analyst must also adjust the data to show what staff the contractor would probably use to perform the service.

(3) This data can now be used for making the deduct analysis. Note that no entry is made on the line of a service that has subparts. Entries are only made for the subparts, since these are specific services. (For example, no entry is made for "operate vehicles" since this service is made up of the specific services of operate taxi, operate scheduled buses, operate unscheduled buses.)

d. Payroll Cost Per Month. Payroll cost per month is the basis for deciding how much each specific service costs in reference to the total job. One need not use exact payroll costs. Rather, use the service contract wage rates appropriate to the service. Again, do not include costs for the services that have subparts. These are noted by X's on figure 2-11.

e. Percent Of Total. The percent of total column on the deduct sheet tells how much each specific service or part represents in terms of the service contract. To arrive at this percentage, add all the payroll costs to get a total and divide each specific service payroll cost by the total cost. Enter each resulting percentage in the percent of total column.

f. Negotiated Contracts. The cost figures created for deduct analysis can be used to evaluate contractor proposals. The contractor should be asked to make a proposal for each specific service. Once these costs are negotiated, they can be used to adjust the original deduct estimates.

CHAPTER 3

WRITING THE STATEMENT OF WORK

3-1. Statements of Work. Job analysis makes writing a statement of work (SOW) relatively easy. Once data has been gathered and analyzed, only two things remain to be done. The first task consists of actually writing a SOW that states what is required. The second task entails writing a QA surveillance plan that complements the SOW. This chapter addresses the first task.

3-2. Writing the SOW. Considering all the data gathering, analysis, and decisions that have been done to this point, writing the SOW should be easy. All that remains is to use a format or outline and compose words that will be used to express the requirement. Each of these tasks is described below. A note of caution: do not repeat material in the SOW that is already included in other parts of the contract, for example, General Provisions, Special Provisions, etc.

3-3. Service Contract Format. Prior to beginning writing the SOW, an outline must be developed to provide structure for the document. The following major sections provide the basis for an outline and are in Section F in most service contracts. The standard numbering scheme for service contracts is numeric (for example, 1, 1.1, 1.1.1).

a. General (Section F-1). This section provides a broad overview to the SOW. It contains a part describing the scope of work. Personnel related matters come under this heading. Most importantly, this section contains a part that states clearly the contractor's specific responsibility for quality control. (This quality control part is in addition to what may be in the standard clauses in the general provisions of a given contract.) This part of the SOW tells the contractor what specific kind of quality control is required for the contract.

b. Definitions (Section F-2). A definitions section includes all special terms and phrases used in the SOW. The definitions must clearly establish what is meant so that disinterested parties will fully understand them.

c. Government-Furnished Property and Services (Section F-3). If the Air Force will provide any of these for the contractor's use in providing the required services, use this section to describe what will be given. If the list(s) is fairly extensive, make it into a technical exhibit(s) and include at the end of the SOW, rather than in the main body.

Use the data gathered concerning facilities, equipment, and material as the basis for these lists.

d. Contractor-Furnished Items (Section F-4). In this section the analyst describes material and equipment that the contractor must provide. As with government furnished property, if the lists are lengthy, they are made a technical exhibit and referenced in this section.

e. Specific Tasks (Section F-5). Specific tasks are the heart of the SOW. All of the work done under job analysis will find its way into this section. To write this section, go back to the tree diagrams and activity analysis sheets which were made in chapter 2.

(1) After the activities that were selected for contracting have been grouped and arranged as they appear in the tree diagram, writing this section is simply a matter of putting the activities down in a logical sequence.

(2) At the same time this is being done, group the performance indicators, standards and acceptable quality levels together in the same logical way for inclusion on a Performance Requirements Summary. Include them as a technical exhibit to the SOW. (See figure 3-1 for an example of this technical exhibit.) At this time, all of the columns can be filled in except the method of surveillance, which is not filled in until the surveillance plan has been developed. The other entries come from performance analysis and the deduct analysis (figures 2-9 and 2-11).

f. Applicable Technical Orders, Specifications, Regulations, and Manuals (Section F-6). During job analysis, the analyst produced a list of applicable directives. Include the list in this section; include the dates of the directives. Tell what happens when a directive changes during the life of the contract. Also, state whether each directive is mandatory or advisory on the contractor.

g. Technical Exhibits. Some items are too bulky to include in the main body of the SOW. Also, the analyst may want to include information helpful to the contractor. Technical exhibits are used for both these purposes.

3-4. Composition. The SOW becomes a part of the contract and is a contractually binding document on both the contractor and the Government. Since the written words translate into cost and profit, every word will be scrutinized, and, if possible, interpreted to the contractor's advantage. The analyst must define and express

VEHICLE OPERATIONS

Required Service	Standard	Maximum Allowable Degree of Deviation from Requirement (AQL).	Method of Surveillance	Deduction from Contract Price for Exceeding the AQL.
Operate Taxi	Customer must be picked up within 4 minutes of the agreed upon time.	5 %		19.2 %
Operate Bus	Bus must not arrive at the stop later than scheduled time or depart earlier than schedule time +5 min.	4%		15.4 %
Operate Unscheduled Bus	Bus must arrive not later than 4 minutes from agreed upon time between customer and dispatcher.	5%		3.8 %

Figure 3-1. Performance Requirements Summary.

each requirement so that the contractor's advantage does not become the government's disadvantage.

a. Style. Style may be described as the mode of construction or development which a person uses to achieve an end product. In particular, the analyst's style refers to a method of expressing ideas in phrases, sentences, and paragraphs. Technical style is the way the analyst assembles the technical information into an exact statement of facts. SOW style revolves around the necessity for technical accuracy. The analyst must strive to include all the essential information in the simplest presentation.

b. Language. The language in a SOW must be exact and concise. Every effort must be made to use the simplest words, phrases, and sentences possible, so that anyone who reads it can understand its meaning, and avoid the risk of misinterpretation.

c. Ambiguity. Perhaps one of the biggest causes of disagreement in a SOW results from the use of indefinite, ambiguous terms, and words with a double-meaning. If ambiguity is present, a court generally holds the party that drew up the contract responsible. Since the government writes its contracts, it is responsible for any ambiguity that may arise.

d. Misused Words and Phrases. Often the analyst inadvertently changes an intended meaning in the SOW through the misuse of certain words and phrases. The following are designed to eliminate some of the misuse.

(1) Use of "shall" and "will." The term "shall" is used to specify that a provision is binding. The word "will" is used to express declaration of future action on the part of the purchaser.

(2) Use the emphatic form of the verb. That is, tell the contractors they must or must not do something. The emphatic form of the verb will insure that one is giving directions, not suggestions, to the contractor.

(3) Do not use "any," "either," "and/or." These words imply a choice that the contractor may take. It is better to avoid them unless a choice is to be made. The word "both" can often be substituted for those words.

(4) Use of pronouns. The use of pronouns is usually regarded as dangerous in the SOW. It is better to repeat the noun and avoid misinterpretation.

(5) Consistent terminology. The same words and phrases must be used throughout the SOW. This is especially true when referring to technical terms and items; for example, always refer to a particular part by the same name.

(6) Numerals. When numerals are used on the drawings and illustrations, use them in the SOW, rather than spelling out the number.

e. Spelling. Most words have only one acceptable spelling; however, throughout the English language there are words that can be spelled several ways. To avoid misunderstanding, adopt the standard spelling.

f. Punctuation. To keep the SOW clear, use simple, short, and concise sentences, so that only the minimum punctuation is needed. A well-planned word order will require a minimum of punctuation. A rule for the analyst should be: When extreme punctuation is necessary, rewrite the sentence.

g. Abbreviations. For the analyst, abbreviations serve as a form of shorthand. Abbreviations can make complex terms easy and precise. However, many misunderstandings also arise from the use of abbreviations because the reader is not always familiar with them. The first time an abbreviation is used in text, show it in parenthesis immediately after the spelled-out word or phrase. This readily defines the abbreviation for further use.

h. Sentences. Sentences in a SOW are often spiced with legal phraseology and high sounding words. This type of writing is difficult to read and understand. Clarity is the analyst's overriding concern. The analyst must try to construct logical sentences that which are exact and concise. It is better to eliminate a long and involved sentence by rearranging it into two or three short, simple sentences limited to a single idea or thought. Good writing of any type is dependent upon natural order. The word order of a sentence tells the reader the function of each word in the sentence. The simple sentences one strives for in a SOW are based on the traditional order of subject-verb-complement or object.

i. Paragraphs. Use a paragraph to state a single idea and elaborate on it. Even though it may appear anywhere in the paragraph, it is best to state the idea (topic sentence) at the beginning, so that the reader can grasp it immediately. The topic sentence, then, is the framework to which other sentences are added to develop and support the original

idea. The ideal length of a paragraph will vary; however, it is generally accepted that the maximum should be from 80 to 100 words.

3-5. Data Submissions. Service contracts often require the contractor to submit data, forms, and other reports. These requirements are included as an exhibit to the statement of work. Use a DD Form 1423, Contract Data Requirements List to list them. Include the description of a data item on DD Form 1664, Data Item Description (see examples in figures 3-2 and 3-3). Other agencies must use their forms that are equivalent to the DD Forms 1423 and 1664.

CHAPTER 4

THE SURVEILLANCE PLAN

4-1. Basic Approach. This chapter describes the major contents of a surveillance plan. There are three key ideas that are the basis for a surveillance plan.

a. Management By Exception. Quality assurance relates to the output service provided by the contractor. As pointed out earlier, the output service can result either from a contractor-developed procedure or from an government specified procedure. When the procedure is specified by the government, compliance with the procedure is the desired output service.

(1) When the output is based on a contractor developed procedure, the procedures are only looked at on a by-exception basis; that is, satisfactory performance of the output service as specified in the contract normally indicates that the contractor is using satisfactory procedures. The government should be concerned only when services are not adequately performed.

(2) In this case, the inspector looks beyond the level of services provided only to determine if the problem is caused by the government or the contractor. If government provided items to the contractor's operation (such as, parts, equipment, or facilities) are at fault, action must be taken through government channels to correct the problem. No action will be required of the contractor. When the problem is the contractor's fault, the contractor is told to take corrective action.

b. Performance Indicator. The level of contractor provided services is monitored by checking the performance values in the statement of work (SOW). As described in chapter 2, a performance value is a feature of the service that can be measured by a number. For example, two important performance values in vehicle maintenance and vehicle operations are vehicle out-of-commission (VOC) rate and taxi response time.

c. Problem Location. When performance values show that the service is not adequately performed, the QAE uses decision tables to locate the problem. The tables provide a logical sequence to find the problem cause. Basically, they are a set of pointers which should find the problem's source in a step-by-step fashion. The construction and use of decision tables are described in paragraph 4-4b.

4-2. Surveillance Information Sources. There are four principal sources of information for surveillance: management information systems, random sampling, checklists, and formal customer complaints. The following sections describe the information sources in detail.

a. Management Information Systems. In a few instances, an existing management information system (MIS) may be available as a means of surveillance. When a MIS is available, as in the case of the Air Force's vehicle integrated management system (VIMS) in the vehicle maintenance area, it can collect information on performance values which can be used instead of random sampling data.

(1) Management information systems usually collect information for 100 percent of the activities for a specified period of time. This information can be compared to a contract standard. On the basis of this comparison, performance can be judged and the performance for the specified period accepted or rejected.

(2) For example, the vehicle out-of-commission (VOC) rate is computed every month by the VIMS. A simple comparison of the VOC rate with the maximum acceptable VOC in the SOW explains a great deal about the level of maintenance service supporting the base vehicles and organizations.

(3) By way of caution, however, one must check the data input into a MIS if the system is maintained by the contractor. If one is going to use a MIS to check the contractor, make sure the MIS contains reliable data.

b. Random Sampling. The most frequently used way of service contract surveillance is random sampling. Services are sampled by the QAE to determine if the contractor's level of performance is acceptable. Acceptance sampling is done, basically, to determine a course of action: that is, whether to accept or reject the contractor's level of performance during a given period of time. If it rejects performance, certain actions are started. If it accepts performance, no action is taken.

(1) The basis for doing random sampling is MIL-STD-105D, Sampling Procedures and Tables for Inspection by Attributes which is widely understood and used by both the government and contractors. It is based on the concept of an attribute. An attribute is a feature of a service which either does, or does not, match a standard (for example, a taxi is on time or it is not on time).

(2) When sampling by attributes, a certain number of observations will match the standards and the remaining number will not match. Therefore, attribute sampling is useful for describing how a job is done, in terms of defects per hundred observations, or percent defective. Using this concept, sampling for a performance indicator can be developed by proceeding through a number of formal steps based on MIL-STD-105D. The use of these concepts is described in paragraph 4-3, Sampling Plan.

c. Surveillance Checklists. Checklists are also used to check contract performance. They must be used sparingly, however. The use of the MIS and random sampling are preferred information sources. Checklists help in surveillance of contract requirements that happen infrequently. (For example, if a contractor is required to perform a service once a month, this service would be included on a checklist.) Any service that is not provided on a daily basis should be considered for inclusion on a checklist unless a MIS can be used to determine the quality of the service.

d. Formal Customer Complaints. Even the best surveillance plan will not allow the QAE to check all aspects of the contractor's performance.

(1) Formal customer complaints are a means of documenting certain kinds of service problems. The way to get and document customer complaints needs to be carefully planned by the persons checking the service contract.

(2) Customer complaints are not truly random. They are seldom used to reject a service or deduct money from the contractor.

(3) When random sampling is the chosen method of surveillance, a customer complaint cannot be used to satisfy a random observation. However, it can be used as further evidence of unsatisfactory performance if random sampling shows that the specific service is unsatisfactory. These complaints can be used to decide if action other than a deduction should be taken.

(a) Getting Customer Complaints. An aggressive customer complaint program, once established, needs to be briefed to every organization that receives the contractor's services. An operating instruction should be given to each organization outlining the customer complaint program, the format and the content of a formal customer complaint, and the action which can be expected from those assigned to watching and managing the service contract.

(b) Documenting the Customer Complaint.

Normally, each customer complaint is brought, either in person or by telephone, to the person checking contract performance. Enter information about the complaint into a Customer Complaint Record, similar to the sample shown in figure 4-1. The record contains the following information:

- 1 Date and time of complaint.
- 2 Source of complaint - organization and individual.
- 3 Nature of complaint (narrative description).
- 4 Contract reference of complaint related services.
- 5 Valid complaint (Yes or No).
- 6 Date contractor informed of complaint.
- 7 Action taken by contractor.
- 8 Signature of the person receiving and validating the complaint.

4-3. Sampling Plan. As a rule, a plan contains information on the acceptable quality level, lot size, sample size, and rejection level. It states the number of units from each lot to be inspected (that is, the sample size). It also states the criteria for determining the acceptability of the lot (acceptance and rejection numbers). This information is used to build the sampling guide which are the major products in a surveillance plan for a service contract.

a. Beginning the Plan. To begin building a sampling plan, go to the Performance Requirements Summary developed during the "Write Statement of Work" step, chapter 3, figure 3-1.

(1) This chart contains the required services, the standards, and acceptable quality levels. At this time decide how the services will be checked (what information source or method of surveillance will be used).

(2) Show these decisions on the chart. For each service where random sampling is used, complete the steps described below.

CUSTOMER COMPLAINT RECORD	
Date and Time of Complaint:	21 Jan 1979 / :1005
Source of Complaint	
Organization:	382 Bomb Wing/LGC
Individual:	Capt John Murry
Nature of Complaint: Called wrecker and it did not arrive until 3 hours after the request.	
Contract Reference: F-5, para 5.1.1.2.5 and Performance Requirements Summary.	
Validation: Contract requires a 1 hour response time. Complaint is valid.	
Date and Time Contractor Informed of Complaint: 21 Jan 79/:1030	
Action Taken by Contractor: Contractor had a person out sick and did not have a back up driver. He has now developed a roster of back up drivers who can operate a wrecker.	
Received and Validated By:	H. Smyth/QAE

Figure 4-1. Customer Complaint Record.

b. Deciding on the Acceptable Quality Level (AQL). The AQL is the highest number of defects per hundred, highest percent defective or highest number of defects that can be allowed for any service performance indicator. There are only a limited number of AQLs listed in MIL-STD-105D but, in virtually all cases, one will be close enough to control the contractor's level of service.

(1) The first step in designing a sampling plan under MIL-STD-105D is the selection of a realistic AQL. No service can be perfectly performed. The AQLs placed on the Performance Requirements Summary in figure 3-1, must be adjusted at this time.

(2) Find the closest AQL from figure 4-2 and use it to replace the original AQL on the Performance Requirement Summary. For example, the AQL for taxi service might have been 5 percent. This would be changed to 4 percent or 6.5 percent since 5 percent does not appear in the figure.

c. Determining the Lot Size. To determine the sample size, the lot size must be known. The lot is how often the contractor provides the service in a period of time.

(1) To determine the lot size, estimate (or count) the frequency of the service to be sampled, during the period it is to be sampled. Thus, if scheduled bus service timeliness is the service being sampled, and a sample is taken each month, the lot size is the number of times that are available during the month to observe bus timeliness. In this case, it would be the number of times the buses go around all the routes each day, multiplied by the number of days in each month on which the bus routes operate.

(2) In the case of workorders, the monthly lot size can be estimated from historical information on file. The projected workload data gathered in chapter 2 is used to help determine lot sizes.

d. Determining the Sample Size. Use figure 4-3 to identify an appropriate sample size for a given lot size.

(1) Use the normal sample size column unless there is a limited number of QAEs or unless the cost of an inspection suggests the use of the medium or small sample size column.

(2) Use the medium or small sample size, if inspections for a particular service are lengthy or hinder the contractor's ability to provide service to customers.

Allowable Acceptable Quality Levels

0.010 %	1.0 %
0.015 %	1.5 %
0.025 %	2.5 %
0.040 %	4.0 %
0.065 %	6.5 %
0.10 %	10. %
0.15 %	15. %
0.25 %	25. %
0.40 %	40. %
0.65 %	65. %

Figure 4-2. List of MIL-STD-105D Acceptable Quality Levels.

Lot Size	Normal Sample Size	Medium Sample Size	Small Sample Size
2-8	2	2	2
9-15	3	2	2
16-25	5	3	3
26-50	8	5	5
51-90	13	5	5
91-150	20	8	8
151-280	32	13	13
281-500	50	20	13
501-1,200	80	32	20
1,201-3,200	125	50	32
3,201-10,000	200	80	32
10,001-35,000	315	125	50
35,001-150,000	500	200	80
150,001-500,000	800	315	80
500,000 and over	1250	500	125

Figure 4-3. Sample Size.

e. Selecting the Rejection Level. Use MIL-STD-105D to identify the acceptance and rejection level for the sample size (see figure 4-4). To use the figure, begin with the known values for the AQL and the sample size.

(1) Find the selected sample size (in the sample size column) and read across that line to the column for the selected AQL. At that point there will either be two numbers or an arrow pointing up or down.

(2) If there is an arrow, follow the direction of the arrow until it leads to a pair of numbers. Of the two numbers at the intersection or at the end of the arrow, the number on the left (Ac or accept) indicates the maximum number of defects which can occur in a sample and still permit the total group or lot to be judged acceptable.

(3) When there is no accept or reject number for a given sample size and AQL, following the arrow will also cause a change in sample size. For example, with an AQL of 1.5 and a sample size of 20, the sample size would become 32.

(4) The number on the right (Re or reject) indicates the minimum number of defects that occur in a sample which causes the total group or lot to be judged unacceptable. For example, suppose the sample size is determined to be 32 and the AQL has been set at 6.5 defects per hundred. Find the number 32 in the sample size column and read across that line until the AQL column for 6.5 has been reached. The two numbers at that intersection are 5 and 6.

(a) In other words, the number on the left, 5, is the number of defects which can be found in a sample and still permit acceptance of the lot.

(b) The number 6, to the right of 5, is the smallest number of defects needed to declare the lot unacceptable and subject to further check, using the decision tables.

4-4. Developing the Sampling Method. The final thing to be decided in sampling is how the sample will be drawn. The objective in the method is to insure that the sample is random (that is, that all services have an equal chance of being selected). To achieve random selection, use a random number table, as explained in the following examples (see attachment 1 for the whole table). Most items will fall into one of these examples.

Single sampling plans for normal inspection

Sample size code letter	Acceptable Quality Levels (normal inspection)																			
	0.010	0.015	0.025	0.040	0.060	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65
	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re
A	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
B	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
C	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
D	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
E	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
F	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
G	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
H	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
I	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
J	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
K	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
L	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
M	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
N	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
P	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Q	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
R	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

- Use first sampling plan below arrow. If sample size equals, or exceeds, lot or batch size, do 100 percent inspection.
- Use first sampling plan above arrow.
- Ac = Acceptance number.
- Re = Rejection number.

Figure 4-4. MIL-STD-105D Acceptance, Rejection Levels for Normal Inspection.

a. Use Of The Random Number Table. The random numbers in figure 4-5 are arranged in groups of five numbers (51259, 77452, and so on).

(1) To use the table, begin by picking at random a group of numbers on any page of the table. This is usually done by closing the eyes and pointing with a pencil or finger to some initial group.

(2) To identify additional random numbers, follow a pattern. Go along a given line to its end and then along the next line to its end and so on through the table until enough numbers have been selected or until the table ends.

(3) If the table ends and there are still more numbers to select, go back to the beginning of the table and continue using the same pattern. Use various patterns alternately; for example, use lines for one sample, use columns for the next sample, and use a diagonal pattern for the third sample.

b. How To Use the Random Number Table To Identify a Random Sample of Consecutively Numbered Workorders. Suppose one has to identify a random sample of 3 workorders for inspection. This can be done at the beginning of the month (before the workorders are written) or at the end of the month (to select workorders already on file).

(1) If there are, or might be, 200 workorders to select from, then one begins by listing the lowest workorder number (known or projected). This could be #001 or possibly #743, for example.

(a) List the highest workorder number (known or projected); in this case, it could be #200 or #943. With these boundaries now enter the random number table to the first group of numbers. For this example, use workorders numbered #743 to #943.

(b) If the last three digits in the first group of random numbers is not between 743 and 943, discard that group of numbers and go to the next group.

(2) Again, using figure 4-5, if one starts at the initial 77452, disregard the two numbers to the left of the three significant digits, or in this case, 77. The remaining number is 452. Since this is not between 743 and 943, go to the next group in the same line which is 16308, again, discard the leftmost two numbers, and the number is 308. This is again too low.

Line	Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1		10480	15011	01536	02011	01647	91646	69179	14194	62590	16207	20969	99570	91291	90700
2		22358	46573	25595	05373	30995	99198	27992	53402	93965	34095	52666	19174	39415	99505
3		24130	48360	22527	07265	76393	44809	15179	24830	49340	32081	30680	19655	61348	18629
4		42167	93093	06243	61680	06254	33376	39440	53305	71341	57084	00849	74917	97759	16419
5		37570	39975	01037	16656	06121	91782	39440	53305	71341	57084	00849	74917	97759	16419
6		77921	06907	11008	42751	27756	53498	18602	70659	90655	15053	21916	91646	44394	42480
7		99562	72905	56420	69994	90872	31016	71194	10738	44013	48040	63213	21069	10634	12952
8		96301	91977	05463	07972	18876	20922	94595	56895	64014	48040	18425	44903	42508	32307
9		09579	14342	63661	10281	17453	18103	57740	44378	25331	12566	58678	44947	05181	56841
10		05475	36857	53542	53988	53060	59533	50867	62300	08150	17983	16439	11458	18593	64952
11		28918	69578	06231	33276	70997	79946	56865	05859	90106	31595	01547	90590	91610	74184
12		63553	40961	48235	03427	49626	49445	18663	72695	52180	20047	12234	90511	33703	90322
13		09429	93969	52616	92737	08974	33488	16320	17617	30015	08272	84115	27156	30613	74952
14		10365	61129	07529	85689	48237	52367	67889	93394	01531	26358	85104	20284	29475	49468
15		07119	97336	71048	08170	77233	13916	47564	81056	97735	85977	29372	74461	28551	90707
16		51085	12743	31821	51259	77432	16308	60756	82149	48442	53900	60960	61920	71601	60719
17		01361	31383	22403	60260	08340	09805	55322	44819	01188	65235	64835	44919	05944	15157
18		01011	54092	33362	24904	11273	04146	85524	20452	71585	85030	51132	01915	92747	44951
19		58142	53916	46369	84586	22773	14515	83149	08734	21481	64350	94738	17752	35156	35749
20		07056	97628	33747	09998	22797	06691	76988	13602	31851	44104	88916	19589	25625	58104
21		48663	91243	05828	14346	09172	30168	90229	04734	59193	12678	10421	61466	99904	32412
22		54164	58492	22421	74103	47070	25306	76268	26384	58181	18277	32239	57102	80428	25280
23		32639	32363	05597	24200	13363	38005	94342	26432	35806	06912	17012	64161	18296	22551
24		29334	27001	07637	87308	58731	00256	45834	15398	46557	41135	73470	64530	34693	90449
25		02488	33062	28834	07351	19731	92420	60952	61280	50001	67658	32586	86679	50720	94953
26		81525	72295	04039	86423	24878	82651	66546	11778	76797	14780	13380	87074	79666	95725
27		29676	20391	68066	66432	44903	20049	89768	81536	96645	12657	32239	57102	80428	25280
28		00742	57392	39064	66432	44903	20049	89768	81536	96645	12657	32239	57102	80428	25280
29		05366	04213	25669	26422	4407	44048	37937	63904	45766	66134	73470	64530	34693	90449
30		91921	26410	64117	94305	26766	25940	39972	22204	71580	64568	91402	42416	07844	94953
31		00592	04711	07917	77341	42206	35126	74087	99547	01817	42607	43808	76655	62028	76650
32		00725	09884	62797	55170	06324	88072	76222	36086	84637	93161	76038	65455	77919	88006
33		69011	65795	95876	52293	19888	27354	26575	08625	40801	59720	28841	80150	12777	48501
34		25976	57948	29888	88604	67917	48708	18912	82271	65424	69774	33611	54262	85963	03567
35		09763	03473	73577	12908	30883	18317	28290	35797	05598	41688	34952	37888	38917	88050
36		91562	42595	27958	30124	04024	86385	39880	99730	55536	84855	29030	09250	79656	43211
37		17955	56349	90939	9127	20044	59931	06115	20542	18057	42008	33708	53317	16103	72711
38		44303	18584	18045	49618	02304	51038	20655	58727	28168	15473	56942	53189	20562	47338
39		92157	89634	54824	78171	84610	82838	20922	25417	48168	40413	25552	21246	35508	20482
40		14577	62765	55602	81263	35667	47358	58873	25417	48168	40413	25552	21246	35508	20482
41		98427	07523	33342	44270	01638	92477	66969	98420	04880	45585	46565	04102	48880	45709
42		34914	63974	08720	82765	34476	17032	87589	40836	32427	70802	70663	88863	77775	49348
43		70040	28277	39475	46473	23219	53416	94770	25832	69975	94884	19661	72828	00102	66794
44		52974	54914	06980	67345	68350	82948	11398	42878	00287	80267	47363	46634	06541	97809
45		78072	25515	40980	07391	58745	24774	23087	80088	39911	80610	41161	14232	60649	97809
46		90725	32210	07974	29992	65831	38057	50490	87765	55657	14361	31720	57275	56284	41548
47		64364	67412	33329	21926	14883	24413	59744	92321	87473	88932	48323	84418	23728	51900
48		08962	00356	31622	23388	61642	40472	57449	35488	86891	19332	28862	42578	78457	41788
49		95012	68379	93524	70785	10592	04542	74463	35488	86891	19332	28862	42578	78457	41788
50		18664	10483	20492	38391	91132	21999	59616	81682	27188	48823	46751	28823	33261	83653

Figure 4-5. How To Use A Random Number Table.

(3) Go to the next number, 60756. The last part of this number, 756, falls within the brackets one is looking for, so workorder 756 is selected to be sampled. The next random number group is 92144. Since 144 is not within the brackets, move to the next group 49442. Again, 442 is not within the brackets and therefore is not selected to be sampled.

(4) This process would be continued until three workorders are selected.

c. How To Use The Random Number Table To Identify Random Sample From a List. If a number of items need to be sampled that are not consecutively numbered, the simplest solution is to list the identifiers, for all the items in the lot, in a column, on a piece of lined paper.

(1) Next, number the lines consecutively, beginning with the number one hundred. Now use the random number table to draw the sample from the line numbers. A selected line number leads to the identifier located on that line and that identifier tells which item to sample. For example, if one chooses to sample a set of workorders with attached sales slips, one is not going to have to have a set of consecutively numbered workorders because not every workorder has a sales slip attached.

(2) List the workorders with sales slips in a column, number each line in the column, and randomly select enough line numbers to make up the sample.

d. How To Use The Random Number Table To Identify a Random Sample of Days. Suppose one wants to identify 4 days in the month on which to sample something. The days of the month can be numbered 01 to 31 (or less, as appropriate). Begin in the random number table in figure 4-5 at 77452.

(1) It is best to use a starting point different from the one used in the previous example but for the purpose of this example it is being used again.

(2) One can move down the column from random number group to random number until the first number between 01 and 31 is spotted. In this case, it is 23216 or, using the rule to discard the numbers to the left of the number of digits, simply 16. Thus the 16th day of the month is selected for sampling.

(3) Continuing in this fashion, one discovers that 58731, or simply 31, or the 31st, is the next day for sampling. Proceed in this manner until the four days for sampling have been identified.

(4) If it is not desirable to sample on weekends, discard those days selected that happen to fall on a weekend and continue that selection until the proper number of days has been selected.

e. How To Use the Random Number Table To Identify a Random Sample of Times of Day. If one wants to select random times of day to sample a service such as taxi or bus service, use the 24 hour clock.

(1) If there are any constraints during each 24-hour period, take them into consideration. For example, suppose that base bus service operates between 0700 and 2345. In this case, go through the number table until one finds a group of four numbers that correspond to an acceptable time between 0700 and 2345. Again, using figure 4-5, and proceeding across the line from the initial number, one comes to 60756 or 0756 hrs as the first random time.

(2) The next random number is 92144 or 2144 hrs. The number is good and so one schedules an observation for 2144 hrs.

(3) Proceed in this manner until the desired number of sample times have been identified.

f. How To Insure Variety in the Use of the Random Number Table. The use of variety in the random number table ensures that detectable patterns do not occur.

(1) Besides starting at different random points and alternating the patterns for finding a string of random numbers, the user may, at some point in time, wish to use the first significant digits instead of the last.

(2) For instance, in the random number group 77452 one has customarily used the last three digits (that is, 452) when looking for a random number with three digits. But there is no reason why one could not for a period of time use the first three digits, or 774.

(3) Success in using the tables requires consistency but also variety. The above information should ensure that the tables are properly used and that the sample is randomly drawn.

4-5. Surveillance Plan Products. Several written documents are included in a surveillance plan:

a. Sampling Guides. A sampling guide is used for surveillance. It is used in a surveillance plan to present

the information needed to sample the performance of a particular service. Information for the sampling guide is developed while the sampling information is being derived for the sampling plan. The steps involved in developing sampling information are described in paragraph 4-3. As shown in figure 4-6, a sampling guide has these sections:

- (1) A statement of the AQL and its meaning in layman's terms.
- (2) The lot size for sampling.
- (3) The sample size.
- (4) A description of the sampling procedure which tells how the service will be sampled.
- (5) An explanation of the inspection procedure which tells what will be checked during the inspection of the sample.
- (6) Acceptable performance criteria which states the acceptance and rejection levels.

b. QAE Decision Tables. Once a problem has been discovered, the inspector must turn to a decision table and use the information in that table to aid him in finding the source of the problem. The decision table lists the symptoms of the problem and identifies the possible sources of the problem. Questions are established for each potential source to determine the contributing factors. A decision logic entry is worked up for each required service. As soon as it is considered satisfactory, the information is transferred to the decision table. An example of a decision logic entry is shown as part of a decision table in the sample in figure 4-7.

c. Checklists. There are two main uses for checklists.

(1) Tally Checklists. Tally checklists are used to document all sample observations made during a sampling period. Checklists may be preprinted with any format which contains the following information:

(a) Contract requirements - a statement of the service being inspected.

(b) Date, time, entry for each observation.

(c) Observation identifier of applicable workorder number, bus stop, or sales slip number, meal period, etc.

VO Sampling Guide #3
Vehicle Condition Monitoring

1. Acceptable Quality Level (AQL): 10%
In the long run there must be no more than 10 defects per hundred vehicles.
2. Lot Size: ____ vehicles operated by the contractor.
3. Sample Size: ____ vehicles operated by the contractor.
4. Sampling Procedure:
At the beginning of the month, list the registration numbers of all contractor operated vehicles on a sheet of ruled paper. Beginning with the number 100, number the lines on the paper to correspond with the vehicle registration numbers. Using the random number table select line numbers equal to the sample size. The vehicle registration numbers on these lines indicate the vehicles to be sampled during the month. Schedule the inspections evenly over the month.
5. Inspection Procedure:
Inspect the vehicles using vehicle/equipment discrepancy and maintenance report as a guide (see AFM 77-310, Vol II, Chap 6). Record defects per vehicle for each of the inspected vehicles. Any defects found not already noted by the contractor shall cause the observation to be recorded as unsatisfactory.
6. Performance Criteria:
 - a. Performance is acceptable when ____ or less defective vehicles are discovered per month.
 - b. Performance is unacceptable when ____ or more defective vehicles are discovered during a month.
7. Phase-In Period: During the first two months of the contract the following AQL's (paragraph 1) and performance criteria (paragraph 6) apply:
 - a. AQL: 15%
 - b. Performance is acceptable if ____ or fewer defects are discovered per month.
 - c. Performance is unacceptable if ____ or more defects are discovered per month.

Figure 4-6. Sampling Guide.

IF THE CONTRACTOR'S DEFICIENCY IS:	PROBABLE CAUSE FACTORS/ IMPACTING CONDITIONS ARE:	WHICH COULD RESULT FROM:	SUGGESTED REVIEW PROCEDURES AND/OR PREVENTIVE MEASURES IS/ARE:
Vehicle out of commission hours too high	High vehicle down for maintenance hours (VDM)	Poor control over work documentation	<p>Review PCNs N310032, N310030, or N310031 for individual vehicles reflecting VDM hours in excess of the reporting period available hours. If this condition exists, it is usually found that two or more work orders were in "open" status for the same vehicle at the same time. Normally results from failure to ensure "close" of a particular work order, and not reviewing the PCN N310018, Work Order Master File Status Report previous to initiating a new work order. (Frequently noted when two or more work orders were required to satisfy contract maintenance work requirements).</p>
		Insufficient manning	<p>Are changes from VDM to VDP status accomplished in a timely manner?</p>
		Improper control over work flow	<p>Review PCN N310032 for individual vehicle data reflecting a very low ratio of direct labor compared to VDM hours accrued. One prime indicator of this problem prevailing is when "Estimated Times in Commission" (ETIC), is constantly slipped. (When work is hardly ever completed within time-frame allotted by labor hour estimates).</p> <p>Determine the appropriateness of workflow prioritizing and the disruptive effect caused by over-reacting to unrealistic application of priorities, such as shifting technicians from one vehicle to another, shuffling vehicles from one location to another for shop spaces, etc.</p>

Figure 4-7. QAE Decision Table.

(d) Result of observation - either satisfactory or defective.

(e) Any pertinent comment for an observation.
An example of a checklist for sampling is shown in figure 4-8.

(2) Surveillance Activity Checklists. When a specific service or procedure occurs rarely or is not important enough to survey on a continuing basis, use a Surveillance Activity Checklist. This type of checklist must be prepared and included in the surveillance plan. An example of this kind of checklist is shown in figure 4-9.

4-6. Contract Administrator's Plan. The contract administrator has an obligation to see how well the QAE is doing the job. The contract administrator must also make some independent checks of contractor performance, preferably by using the same techniques that go into the design of the QA surveillance plan. (This plan is completed at the same time as the surveillance plan.) As a minimum this plan must call for a quarterly review of the QAE's use of sampling guides and an annual review of surveillance activity checklist items.

Vehicle Operations Sampling Guide #3					
Vehicle Condition Monitoring					
Registration Number	Date	Time	Satisfactory	Un-satisfactory	Remarks
B 7305	2 Oct	1530	X		
B 9763	2 Oct	1540		X	Hood latch KLG
B 8764	2 Oct	1545	X		
B 0010	5 Oct	0900	X		
B 8764	5 Oct	0915	X		
B 7707	5 Oct	1345	X		
B 7706	5 Oct	1400	X		
B 9654	8 Oct	1000	X		
B 8752	8 Oct	1025		X	Door handle KLG
B 3103	8 Oct	1045	X		
B 2758	8 Oct	1600			

Figure 4-8. Sample Tally Checklist.

FIGURE 4-9.

SURVEILLANCE ACTIVITY CHECKLIST (To be performed (Daily) (Monthly) (Weekly), etc.).					
VEHICLE AUTHORIZATION UTILIZATION BOARD (VAUB)	CONTRACT REQUIREMENT	CONTRACT PARAGRAPH NO	METHOD OF SURVEILLANCE	DATE ACCOMPLISHED	WHERE ACCOMPLISHED
	The contractor is required to hold a Vehicle Authorization Utilization Board (VAUB) quarterly.	F-5 5.1.2.3	The contractor should have in his possession a copy of the VAUB minutes.		
			There is no specific format for these minutes in AFM 77-310 but should conform to the standard format in AFR 10-1. Minutes should adequately describe and document actions taken by VAUB.		
	The contractor is required to develop a vehicle priority list for VAUB approval.	F-5 5.1.2.3.5	Verify approved priority list. It should have the board president's signature and date.		

CHAPTER 5

DOING SURVEILLANCE

5-1. Surveillance Methods. This chapter tells how to do surveillance once the plan is written. It tells how to build a monthly schedule, how to use the surveillance plan, and what to do when there is poor contractor performance. This chapter applies to Quality Assurance Evaluators (QAEs) and contract administrators.

5-2. Building A Schedule. A surveillance plan is organized to facilitate use by the QAE. The QAE is responsible for developing a monthly schedule for activities, based on the surveillance plan's requirements. Complete the Quality Assurance Evaluator Schedule by the last workday of the preceding month and send a copy to the contract administrator and the functional area chief for their information and review. Each QAE builds a schedule by filling in the blocks on the schedule. Specific instructions for filling out the schedule are provided below.

a. Quality Assurance Evaluator Schedule. An example of a surveillance schedule is shown in figure 5-1. The left-hand side of the schedule divides the sheet into days of the week. This example shows only a 7-day schedule. The QAE must make up enough sheets to include each day of the month. Along the top of the schedule, insert the items to be checked during the month. Along the bottom of the schedule, indicate the number of observations to be made during the month (that is, how often a MIS is checked, how many samples will be taken, how often a surveillance checklist will be used).

b. Filling In And Updating the Schedule. To fill in the inspection schedule, the QAE refers to the sampling guide for each service being monitored. The sampling guide is used with the random number table to determine the inspections (observations) to be made during the month (see chapter 4, paragraph 4-4).

(1) Contract surveillance must cover all hours of operation. Random observations are scheduled at night, on weekends and holidays when services are performed during these periods. Areas that are monitored on a set schedule (for example, VIMS standards and analysis reports) are included in the monthly schedule. This monthly schedule shows where and what the QAE is monitoring at all times.

QAE Surveillance Schedule									Week of: 1 thru 7 Jan 78	
Day	VO Sampling Guide #1	VO Sampling Guide #2	VO Sampling Guide #3	VM Sampling Guide #1	VM Sampling Guide #2	RA Sampling Guide #1	RA Sampling Guide #2	Check AF Forms 15		
1 Jun		:2215#9 :2345#54	B7125 B6704	7328 7340 7345						
2 Jun		:0715#63 :0815#2	B4392 B8763	7350 7370 7400	:0900					
3 Jun			LEAVE							
4 Jun	:0915 :0956	:0900#4 :0915#59 :1002#64 :1023#83	B9763 B8794 B1001							
5 Jun	:1101				:1305			X		
6 Jun	:0710 :1022 :1303									
7 Jun										
Week Total	6	8	7	6	2					
Month Total	20	32	32	32	5		50			

Figure 5-1. QAE Surveillance Schedule.

"For Official Use Only"

(2) Post any changes to the schedule weekly and send copies to the contract administrator and to the functional area chief. Document and explain the reasons for each change. Actual surveillance activity recorded on the surveillance checklist must be comparable to the monthly schedule.

(3) As updated, one must be able to conduct a complete audit trail from the monthly schedule, to observing the QAE perform sampling, to completion of the surveillance checklist.

(a) There must also be a correlation between contractor performance versus standards, AQLs, checklists and actions taken by the contract administrator. The sample in figure 5-1 shows the schedule for one week. The QAE completes the blank forms, indicating week of (Monday through Sunday), and enters the time, observation, and check (if pertaining to a checklist), in the blocks corresponding to the item and day.

(b) After it is completed and filled in, this form is "FOR OFFICIAL USE ONLY" and must not be shown to the contractor.

5-3. Doing Surveillance. Doing surveillance involves using the surveillance plan called for in the monthly schedule. Use the following procedure to record observations and take action when the contractor's defects exceed the allowable number.

a. Recording Observations. Monthly tally and surveillance checklists are used for each sampling guide and less frequently checked services. They are used to tally information on scheduled observations and defects noted. Each observation in the sample is recorded on the checklists, and the documents then become a formal government record for later reference.

(1) When random sampling guides are used, the tally of observations and defects at the end of each month are compared to the acceptable number of defects appearing in the sampling guide.

(2) The contractor is told each time an error is found during scheduled observations and asked to initial the observation recorded on the checklist.

(3) Errors found in services not scheduled for observation should be brought to the contractor's attention but not used to count as a defect for determining if the AQL has been met.

(4) Checks done with a surveillance activity checklist are likewise recorded.

b. Potential Unsatisfactory Performance. If the sampling guide or surveillance activity checklist indicates that the number of defects is too high, the QAE goes to the decision table for that service indicator.

(1) The QAE must locate the specific service that is unsatisfactory. The table will identify the possible causes of the unsatisfactory performance and list a number of questions which, if answered, will probably pinpoint the source of the problem.

(2) The decision table helps the QAE identify the problem so that, among other things, a meaningful evaluation can be made of the contractor's explanation and corrective action. For example, if the contract specifies a maximum out-of-commission rate for vehicles of 8 percent, and the rate was 10 percent, examination may reveal the excess was caused by excessive vehicle down for parts (VDP). This could have been caused by the government's inability to provide timely parts support.

(3) In such a situation, the contractor may not be at fault. If, on the other hand, the excessive VDP was created because the contractor ordered the parts on a routine priority rather than priority, it might be the contractor's fault. The decision tables will assist the QAE in making such a determination.

c. Documenting Unsatisfactory Performance. If performance in any area is judged unsatisfactory, the contractor is required to respond to a Contract Discrepancy Report (CDR). See sample in Figure 5-2.

(1) The QAE prepares the form and sends it to the contracting officer, who signs and sends it to the contractor.

(2) When completed and signed, the report, along with the tally checklist or surveillance activity checklist become the documentation supporting payment, nonpayment, or other necessary action.

5-4. Taking Action. The QAE may check the contractor's performance and document any non-compliance, but only the contracting officer may take formal action against the contractor for unsatisfactory performance.

CONTRACT DISCREPANCY REPORT				
1. CONTRACT NUMBER F12345-79-98765				
A. TO: (Contractor and Managers Name) Vehicles Inc. - Mr. Travis			B. FROM: (Name of QAE) Mr. Smyth	
DATES				
PREPARED 1 Sept 79	ORAL NOTIFICATION 1 Sept 79		RETURNED BY CONTR 5 Sept 79	ACTION COMPLETE 10 Sept 79
7. DISCREPANCY OR PROBLEM: (Describe in detail; include reference to SOW/Directive; attach continuation sheet if necessary.) Reference the performance requirements summary Exhibit 12. The contract requires that taxi service meet a four minute response time with an acceptable quality level of 15%. Random observations indicate that this standard was not met. In a sample of 20 dispatches, 40 pickups exceeded the standard..				
8. SIGNATURE OF Contracting Officer <div style="text-align: right;"><i>Cleaver Dubing</i></div>				
9. TO: (Contracting Officer)			FROM: (Contractor)	
10. CONTRACTOR RESPONSE AS TO CAUSE, CORRECTIVE ACTION AND ACTIONS TO PREVENT RECURRENCE: ATTACH CONTINUATION SHEET IF NECESSARY. (Cite applicable Q.A. program procedures or new Q.A. procedures.) During August, there was a limited number of drivers and vehicles available due to sickness and maintenance. I will initiate short morning coordination meetings each day at 7:30 a.m. so that maintenance and operations personnel can assure that enough drivers and vehicles are available for daily activities.				
11. SIGNATURE OF CONTRACTOR REPRESENTATIVE <div style="text-align: center;"><i>John W. Travis</i></div>				DATE 5 Sept 1979
12. GOVERNMENT EVALUATION (Acceptance, partial acceptance, rejection; attach continuation sheet if necessary.) The proposed corrective action and explanations are acceptable.				
13. GOVERNMENT ACTIONS (Payment deduction, cure notice, show cause, other.) The contractor's actions should prevent further recurrence. A deduction of \$6750 will be made from the August invoice computed as follows: <div style="text-align: right; margin-right: 50px;"> Monthly Cost - \$90,000 Deduct Percentage 15% <u>Percent of Sample Defective 50%</u> Deduction \$6750 </div> If this recurs next month a deduction will be taken plus a cure notice will be issued.				
CLOSE OUT				
	Name - Title	Signature	Date	
CONTRACTOR NOTIFIED	Mr. Travis - Manager	N/A	10 Sept 79	
QAE	Mr. Smyth	<i>Harmon Smyth</i>	10 Sept 79	
ACO	Mrs. Dubing	<i>Cleaver Dubing</i>	10 Sept 79	

Figure 5-2. Contract Discrepancy Report.

a. Ground rules. This section lists the normal steps to be taken by contract administration when the QAE reports these deficiencies. The actions listed are not hard-and-fast rules, and are a minimum. More serious action can be taken sooner.

(1) When the contractor's performance is unsatisfactory as defined in the surveillance plan and a formal action is indicated, the QAE, the functional area chief, and the contract administrator meet to determine what action is appropriate for the specific circumstances.

(2) If a decision is reached not to take a monetary deduction, the reasons are documented. The contracting officer must indicate agreement with the decision by signing the contract discrepancy report or other decision documentation.

b. Actions. Following are the actions normally taken when poor performance is found.

(1) As a rule, the QAE tells the contractor's site manager, in person, when discrepancies occur and asks the contractor to correct the problem. The QAE makes a notation on the tally or surveillance checklist, of the date and time the deficiency was discovered, and has a contractor representative initial the entry on the checklist.

(2) If the number of discrepancies found exceeds the level for satisfactory performance, the QAE uses the decision tables in the surveillance plan to determine the cause(s).

(a) If the government created any of the discrepancies, these are not to be counted against the contractor's performance.

(b) When the government has caused the contractor to perform in an unsatisfactory manner, the QAE prepares a letter to be sent to the responsible organization requesting corrective action be taken. The QAE sends it to the organization through the contracting officer.

(3) When the contractor is responsible for exceeding the limits of satisfactory performance, the contracting officer issues a contract discrepancy report (CDR) to the contractor (see paragraph 5-3c). If the failure is serious enough, issue the CDR at the time of the unsatisfactory performance, rather than at the end of the month.

(4) When a CDR is issued for a specific service the contracting office deducts from the month's payment, an amount up to the percentage indicated in the Performance Requirement Summary exhibit of the contract. Do not delay the deduction until the contractor responds to the CDR. If surveillance was done right and the decision tables used, the unsatisfactory performance is clearly the fault of the contractor. For a specific example of a deduction, see paragraph 5-5.

(5) If the contractor does not achieve satisfactory performance in that specific service by the end of the next month, the contracting officer issues another CDR and deducts the appropriate amount from the contractor's payment.

(6) If a third CDR must be issued, consider issuing a cure notice. (However, a cure notice can be issued sooner, if necessary).

(7) Depending on the contractor's overall performance, the government may issue a Show Cause letter if the reply to a cure notice is unsatisfactory; next consider terminating the contract.

5-5. Deductions For Non-Performance. Through the Inspection of Services clause, the government can deduct from a contractor's payment an amount equal to the services not provided.

a. To do this, the contract administrator must know the major cost categories in the contract and the percentage of cost each service output represents. The percentage cost of each service is found in deduct analysis; see chapter 2, paragraph 2-9. An example of how the deduct formula works is shown in figure 5-3.

b. Suppose the bid schedule showed the monthly contract price for vehicle operations, maintenance, and analysis as shown. The percentage cost of the service output is then found by looking at the Performance Requirements Summary Technical Exhibit in the contract statement of work. In the example, the percentage cost of quality of completed work is 10 percent. This is then multiplied by \$100,000 to obtain the maximum amount to deduct.

c. If completed work was unsatisfactory during the month (that is, did not meet performance values) and the percent of the sample found bad was 20 percent, \$2000 would be deducted from the payment normally due the contractor.

Deduct Formula (Example)

If: Quality of completed work is unsatisfactory
 (AQL of 6.5% exceeded)

and: Contract price is \$100,000 per month

and: Quality of completed work deduct percentage is 10%

and: Sample size is 50

and: Number of defects in the sample is 10 (Reject number is 8)

Then: Deduction from the current month's invoice is:

Contract price	=	\$100,000
X Deduct percentage	=	<u>.10</u>
		\$10,000
X Percent of sample defective		<u>.20</u>
Deduction	=	\$ 2,000

Figure 5-3. Deducting for Non-Performance.

d. This amount for quality of completed work is deducted because the contractor failed to provide reliable, uniform services within the assigned performance values. Although some completed work may have met the standard during the month, the acceptable quality level was not met and at least 20 percent of the observations were defective. Hence, the total quality performance requirement has not been achieved. As a consequence, the service output is unsatisfactory.

5-6. Good Performance. When a contractor's quality control program works, good performance results. If the result of a QAE's surveillance shows consistently good performance, the amount of surveillance can be decreased.

a. Reduced Inspection. Inspection can be reduced when the following conditions have been met for a sampling guide.

(1) The preceding 4 lots (that is, the last 4 months) have all been acceptable.

(2) The number of defects in each of the preceding 4 lots is less than one half of the acceptance number. For example, with an AQL of 6.5 percent and a sample size of 32, the acceptance number is 5. If two or less defects were found in each of the last 4 lots, reduced inspection could be used.

(3) The normal sample size is being used.

(4) The functional area chief and the contract administrator agree to use reduced inspection.

b. Reduced Sample Size and Acceptance or Rejection Numbers. Reduced inspection decreases the sample size as shown in figure 5-4. In addition, the acceptance and rejection numbers change as shown in figure 5-5. To make the changes to the existing sampling guide, take the following steps.

(1) Make sure that the original sampling guide was using the normal sample size. To determine this, see Chapter 4, figure 4-3 and compare the lot size with the sample size in the sampling guide.

(2) Find the new sample size by using figure 5-4. Take the lot size and find the new reduced sample size.

(3) Using the AQL in the sampling guide and the new reduced sample size, see figure 5-5 for the new acceptance

Lot Size	Normal Sample Size	Reduced Sample Size
2-8	2	2
9-15	3	2
16-25	5	2
26-50	8	3
51-90	13	5
91-150	20	8
151-280	32	13
281-500	50	20
501-1,200	80	32
1,201-3,200	125	50
3,201-10,000	200	80
10,001-35,000	315	125
35,001-150,000	500	200
150,001-500,000	800	315
500,001 and over	1250	500

Figure 5-4. Reduced Sample Size.

Single sampling plans for reduced inspection

Sample size code letter ¹	Sample size	Acceptable Quality Levels (reduced inspection) ²																				1000
		0.010	0.015	0.025	0.040	0.065	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	
A	2	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
B	2	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
C	2	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
D	3	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
E	3	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
F	3	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
G	13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
H	28	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
J	32	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
K	50	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
L	80	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
M	125	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
N	200	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
P	315	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Q	500	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
R	800	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

- Use first sampling plan below arrow.
- Use first sampling plan above arrow.
- Ac Acceptance number.
- Re Rejection number.
- ↑ If the acceptance number has been exceeded, but the rejection number has not been reached, except the lot, but misstates normal inspection.

Figure 5-5. MIL-STD-105D Acceptance, Rejection Levels for Reduced Inspection.

and rejection numbers. Note that there is a gap between the acceptance and rejection numbers (for example, sample size 32 and AQL 6.5 percent, accept is 5 and reject is 8). This means that the lot would not be rejected unless 8 defects were found and would be accepted if 5 or less defects were found. However, a number of defects greater than five will be cause for returning to normal inspection (that is, return to the sample size and acceptance and rejection numbers used in the original sampling guide).

c. Returning to Normal Inspection. When reduced inspection is in effect return to normal inspection the next month under the following conditions.

(1) When the number of defects exceeds the acceptance number under reduced sampling or,

(2) The functional area chief and the contract administrator deem it necessary to return to normal inspection.

d. Returning to Reduced Inspection. If during the first month of the return to normal inspection, the number of defects found is again less than 50 percent of the reject level, a return to reduced inspection may be done the next month. If the number of defects found is over 50 percent, then normal sampling must be accomplished until 4 months of less than 50 percent of reject level defects are found.

5-7. Documentation. During the course of the contract the QAE retains a copy of all inspection schedules, tally checklists, and surveillance activity checklists. At the end of the contract period, the QAE forwards these records for inclusion in the contract file. However, when a specific service becomes unsatisfactory during a surveillance period, the inspection documentation supporting the contract discrepancy report is forwarded to the contracting officer no later than 5 working days after the end of the previous performance period.

CHAPTER 6

QUALITY CONTROL AND PREAWARD SURVEYS

6-1. Quality Control Clause. Each standard SOW contains a contractor quality control clause. This clause provides specific implementation of the standard Inspection of Services clause normally present in service contracts.

a. Contracting officers must pay particular attention to this requirement during the preaward survey and must make sure that the contractor provides a written quality control program prior to the contract start date.

b. To aid contractors in developing a quality control program, the contracting officer must provide the government Quality Assurance (QA) Surveillance plan along with the Invitation for Bids or Request for Proposal.

c. Make sure to mark the QA surveillance plan with the following statement: "For Information Purposes Only. This Quality Assurance surveillance plan is not part of the Request for Proposal or Invitation for Bids nor will it be made part of any resulting contract." Use this statement since the government must retain the right to change or modify inspection methods.

d. An example of a clause is as follows:

Quality Control

a. Quality Control. The contractor shall establish a complete quality control program to assure the requirements of the contract are provided as specified. One copy of the contractor's basic quality control program shall be provided to the Contracting Officer at the preaward survey conference or not later than at the pre-performance conference if a preaward survey is not conducted. An updated copy must be provided the Contracting Officer on contract start date and as changes occur. The program will include, but not be limited to the following:

(1) An inspection system covering all the services stated in the Performance Requirements Summary of the Statement of Work. It must specify areas to be

inspected on either a scheduled or unscheduled basis and the individuals who will do the inspection.

(2) A method of identifying deficiencies in the quality of services performed before the level of performance is unacceptable.

(3) A file of all inspections conducted by the Contractor and the corrective action taken. This documentation shall be made available to the Government during the term of the contract.

b. Quality Assurance. The Government shall monitor the Contractor's performance under this contract using the quality assurance procedures specified in the Performance Requirements Summary of the Statement of Work.

6-2. Preaward Survey (PAS). A SOW and a sound quality assurance surveillance plan go a long way toward making sure that quality results come from a contract. The other essential ingredient is a good contractor. The preaward survey helps the government insure that it awards the contract to a qualified bidder. In other words, the contractor must be responsible as well as having the lowest price (or lowest evaluated price) before the government makes award. The preaward survey is a method to determine responsibility.

6-3. Preaward Survey Clause. Include a clause like the following, but adapted to the specific SOW:

Financial and Technical Ability.

a. If a bid submitted in response to this solicitation is favorably considered, a two part preaward survey may be conducted to determine the bidder's ability to perform. Part One will be conducted by (Insert name of office) who may contact you to determine your financial capability to perform. Current financial statements and pertinent data should be available at that time. Part Two of the survey

will be conducted at (Name Location) shortly after bid opening by government personnel.

b. If a preaward survey is conducted, you will be requested to have management officials, of the appropriate level, represent your firm. In addition, your proposed project manager should be available to respond to questions raised during the preaward survey. You should also be prepared to present a briefing regarding the manner in which you intend to accomplish your contractual obligations. As a minimum, you should address the following items of information in your presentation (a written copy of the presentation with the backup data below must be submitted to the contracting officer 5 work days before the presentation):

- (1) Startup and phase-in schedule.
- (2) Key personnel letters of intent and resumes.
- (3) Availability of labor force, plan for recruiting, type and extent of training.
- (4) The role of the project manager and the extent of his/her authority.
- (5) Organizational and functional charts reflecting line of management responsibility.
- (6) Manning charts in a format requested by the contracting officer (only to be used to ensure that you understand the workload).
- (7) Plans and management procedures for logistical administrative support of all functions; that is, contractor furnished supplies and equipment and procedures for timely payment of personnel.

(8) Procedures to be used to ensure contract requirements are met (quality control program).

(9) Corporate experience, as evidenced by past and present contracts.

(10) Other purchases for which you have bid and for which you are apparent low bidder.

Some negotiated and two-step forms of contracting use technical proposals to determine how well someone understands the statement of work. Adapt the clause above and include it as evaluation factors in the solicitation.

6-4. Preaward Survey Method. The contracting officer makes the decision to conduct a preaward survey based on knowledge of the bidder's past performance. When the contracting officer decides to conduct a preaward survey the guidelines in paragraphs 6-5 to 6-8 apply. These guidelines are not hard and fast procedures and the contracting officer must adapt them to the specific survey requirements.

6-5. Preaward Survey Team. This team can be composed of either acquiring activity or outside office support such as the Defense Contract Administration Service (DCAS) in the Department of Defense or both. The PAS has two parts; that is, financial and technical. The acquiring activity or the outside office can run the technical part. However, when the outside office runs the technical part, the acquiring activity should supplement the team with appropriate persons, such as the buyer, functional experts, etc.

6-6. Outside Office and the Acquiring Activity Perform the PAS. The buyer takes the following actions as soon after bid opening as possible when an outside office performs the financial PAS and the acquiring activity performs the technical PAS:

a. Request the outside office to perform that part of the PAS that is to be done by them (financial).

b. Request information required by Financial and Technical Ability clauses from the bidder. See paragraph 6-3 above.

c. Send blank manning charts to the bidder for submission during the PAS.

d. Emphasize to the bidder the importance of having a detailed quality control program for presentation at the PAS.

e. Remind the functional person to have estimated manning charts available for the PAS. These charts must estimate what contractor manning would be required to perform the requirement. They may not estimate what it would take government personnel to accomplish the tasks.

f. Coordinate the date of the PAS with the technical PAS team chief and the contractor. Notify the contractor of the finalized date and location of the PAS.

g. Perform the PAS. Do all tasks in paragraph 6-7a thru 67-g.

6-7. Technical Evaluation. Perform the following tasks.

a. Evaluate the adequacy of the financial PAS performed by the outside office. Check the bidder's financial statements if they are submitted.

b. Thoroughly analyze manning charts submitted by the bidder. The following procedures apply:

(1) First, validate the government prepared contractor manning estimates. Make sure the government did not overestimate.

(2) Next, compare the bidder's charts to the government estimate. Insure that:

(a) Bidder's total manning is comparable to the estimate. A variance of more than twenty percent should be considered suspect.

(b) The bidder has the right classes of employees on duty at the appropriate times.

(c) The bidder has sufficient personnel on duty during peak or key workload periods.

(3) Next, analyze the contractor's net bid to see if it will support the level of manning proposed. Use the following procedures.

(a) Compute total man-hours for each labor category in the wage determination.

(b). Use a format similar to the following to compute the estimate of the contract price:

<u>Labor Category</u>	<u>Total Hours</u>	<u>Hourly Rate</u>	<u>Personnel Cost</u>
	x	\$ ----	= \$ ----
	x	----	= ----
	x	----	= ----
	Total Direct Labor Cost		\$ ----
Supervisory Costs			----
Leave Costs			----
	Total Labor Cost		\$ ----
Payroll Tax and Insurance			----
Health and Welfare (Hours times dollar rate)			----
Material, Supplies and Equipment			----
	Total Direct Costs		\$ ----
Overhead			----
General and Administrative Costs			----
	Total Costs		\$ ----
Profit			----
	TOTAL ESTIMATED PRICE		\$ ----

(4) The bid price frequently may not support the total number of direct labor hours proposed by bidder on the manning charts. Ask to see the bidder's bid preparation sheets. The bidder doesn't have to show them but usually will if one explains the data is needed to verify that direct costs (labor, material, etc.) are not underestimated. Once this information has been provided, retain it. It may be helpful in the event of future negotiations.

c. Make sure to have the latest supply consumption data if the bidder is going to furnish the supplies. Compare this with bidder's information (when provided) to insure that the bidder has not underestimated supplies.

d. A serious underestimation of total costs, or a serious misapplication of the man-hours proposed, indicates a lack of understanding of contract requirements. This is

where the technical representative goes to work. Interview the bidder and find out whether or not the bidder understands the job.

e. Besides the total estimate, financial PAS and general evidence of competence, the next most important factor is the bidder's proposed quality control plan. This plan should be detailed enough for the PAS team to evaluate and determine that the bidder actually knows what to do.

f. The bidder's performance history is also a very important subject to be thoroughly covered by the PAS team. Establish complete and thorough documentation if a determination of nonresponsibility is going to be based upon lack of tenacity, perseverance or integrity.

g. PAS reports must state the facts, draw a conclusion based upon those facts and end with a recommendation to the contracting officer.

6-8. Outside Office Performs the PAS. If an outside office such as DCAS is going to perform the financial and technical PAS, the buyer does the following:

a. Ask the office to perform the PAS. Indicate which particular acquiring activity will assist in the PAS. Name the personnel in the request; for example, buyer, food services officer, etc.

b. Provide all acquiring activity team members written guidance as to duties and responsibilities. Provide it in enough time for members to study and fully understand their responsibilities.

c. Insure that acquiring activity team members realize that the outside office is running the PAS, and that they understand that they have a very important input (the outside office may be lacking in a particular area of expertise that the acquiring activity provides).

Random Number Table

Page 1

Line	Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1		10480	15011	01536	02011	81647	91646	69179	14194	62590	36207	20969	99570	91291	90700
2		22368	46573	25595	85393	30995	89190	27982	53402	93965	34095	20966	19174	39615	99505
3		24130	48360	22527	73263	64809	15179	45393	24830	49340	32081	30680	99655	63348	58629
4		42167	93093	06243	61680	07856	16376	39440	53537	71341	37004	00849	74917	97758	16379
5		37570	39975	81837	16656	06121	91702	60468	81305	49684	60672	14110	04927	01263	54613
6		77921	06907	11008	42751	27756	53498	18602	70639	90655	15053	21916	81425	44394	42480
7		99368	72905	56420	69994	31016	71194	18872	70738	44013	18840	63213	21069	10634	12952
8		96301	91977	03463	07972	18876	20922	94595	56869	49014	60043	14225	42508	32307	
9		89579	14342	53661	10281	17453	18103	57740	84378	08158	12566	56678	44947	05585	56941
10		85475	36857	53342	53988	53060	59533	38867	62300	08158	17983	16439	11458	18593	64952
11		28918	69578	88231	33276	70997	79936	56865	05859	90106	31595	01547	85290	91610	78188
12		63353	40961	48235	03427	49626	69445	18663	72695	52180	20847	12234	90511	33703	90322
13		09429	93969	52636	92737	88974	33488	36320	17617	30015	08272	84115	27156	30613	74952
14		10365	61129	87529	85689	48237	52267	67689	93394	01511	26358	63104	20285	29975	89468
15		07119	97336	71048	08178	77233	13916	47564	81056	97735	65977	29372	74461	28551	90707
16		51085	12765	51821	51259	77452	16308	60756	92144	49442	53900	70960	63990	75601	40719
17		02368	21382	72404	60268	89368	19885	55322	44819	01188	53255	64935	44919	05444	55157
18		01011	54092	33362	94904	31273	04146	18594	29832	71585	85030	51132	01915	92747	64951
19		52162	53916	46369	58586	23216	14513	83149	98736	23495	64350	94738	17752	35156	35749
20		07056	97628	33787	09998	42698	06691	76988	13602	51851	46104	88916	19509	25625	58104
21		48663	91245	85828	14346	09172	30168	90229	04734	59193	22178	30421	61666	99904	32412
22		54164	58492	22421	74103	47070	25306	76468	26334	58151	10664	15234	15237	94909	44592
23		22634	27001	05597	24200	13363	38005	94342	28728	35806	06912	17012	64161	18296	22851
24		02488	33062	87637	87308	58731	00256	45834	15398	46557	41135	10367	07874	36188	18510
25		81525	72295	04839	96423	24878	82651	66566	14778	76797	14780	13300	87074	79666	95725
26		29676	20591	68086	66432	46901	20849	89768	81536	86645	12659	92259	57102	80428	25280
27		00742	57392	39064	26432	84673	40027	32832	61362	98947	96067	64760	64584	96096	98253
28		05366	04213	25669	26422	44407	44040	37937	63904	45766	66134	75470	64530	34693	90449
29		91921	26418	64117	94305	26766	25940	39972	22209	71500	64568	91402	42416	07844	69618
30		00582	04711	87917	77341	42206	35126	74087	99547	81817	42607	43808	76655	62028	76630
31		00723	69884	62797	58170	86324	88072	76222	36086	84637	93161	76038	65855	77919	88006
32		69011	65795	85876	58283	18988	27354	26575	08625	40801	59920	29841	80150	12777	48501
33		25976	57348	29888	86604	67917	48706	18912	92271	65424	69774	33611	54262	85963	03547
34		09763	83473	75377	12908	30883	18317	28290	35797	05998	41888	34952	37888	38917	88050
35		91567	42595	27958	30134	04024	86385	29880	99730	55536	84855	29080	09250	79656	73211
36		17955	56349	90999	49127	02044	59931	06115	20542	18059	02008	73708	83517	36103	42391
37		46507	16584	18845	49618	02304	20655	15475	58727	94168	15475	56942	53389	20562	87338
38		92157	09634	94824	78171	84610	82834	09922	25417	44137	48413	25555	21246	35509	20468
39		14577	82765	35608	81263	39667	47358	56873	56307	61607	49518	88686	20103	77490	18062
40		98427	01523	33362	64270	01628	92472	69569	98420	04880	45585	46565	84102	46880	45709
41		34914	01523	88730	28765	34476	17032	87569	40836	32427	70002	70663	84863	77775	69348
42		70060	28277	59475	46473	33219	53416	94970	25832	69975	94884	19661	72842	00102	66794
43		53976	54914	06990	67324	68350	82974	11398	42878	80287	88267	47363	46634	08541	97409
44		76072	28515	40980	07391	58745	25774	22987	80059	39911	96189	41151	14222	06697	59583
45		90725	52210	63974	29992	65831	38857	50490	83765	55657	14361	31720	57375	56228	41546
46		64364	67412	33339	31926	14803	32413	59743	92331	97473	89286	35931	45110	78526	51900
47		08962	00358	31662	25388	61642	34072	81249	35648	56091	48373	48373	45578	78547	81788
48		95012	68379	93526	70765	10592	04542	76463	54328	02349	17247	28865	14777	62730	92277
49		15664	10493	20492	38391	91132	21999	59516	81632	27195	48223	46751	22923	32241	85653
50															

Line	Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
51		16408	81899	04153	53381	79401	21438	93035	23502	36693	31238	58640	91754	78774	98338
52		16629	81953	05520	91962	90901	13099	97862	24013	18733	30496	58099	90724	78774	98338
53		17311	82101	07498	97637	99016	13099	97862	24013	18733	30496	58099	90724	78774	98338
54		17491	82703	09167	99323	15021	13131	12546	19758	09980	45393	66666	12515	90724	98338
55		17605	83246	11422	14422	15021	13131	12546	19758	09980	45393	66666	12515	90724	98338
56		17711	83806	13099	15900	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
57		17825	84406	14703	17595	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
58		17939	85006	16399	19289	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
59		18053	85606	18092	20982	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
60		18167	86206	20000	22675	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
61		18281	86806	21703	24368	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
62		18395	87406	23400	26061	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
63		18509	88006	25100	27754	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
64		18623	88606	26800	29447	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
65		18737	89206	28500	31140	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
66		18851	89806	30200	32833	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
67		18965	90406	31900	34526	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
68		19079	91006	33600	36219	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
69		19193	91606	35300	37912	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
70		19307	92206	37000	39605	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
71		19421	92806	38700	41298	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
72		19535	93406	40400	42991	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
73		19649	94006	42100	44684	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
74		19763	94606	43800	46377	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
75		19877	95206	45500	48070	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
76		19991	95806	47200	49763	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
77		20105	96406	48900	51456	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
78		20219	97006	50600	53149	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
79		20333	97606	52300	54842	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
80		20447	98206	54000	56535	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
81		20561	98806	55700	58228	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
82		20675	99406	57400	59921	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
83		20789	100006	59100	61614	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
84		20903	100606	60800	63307	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
85		21017	101206	62500	65000	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
86		21131	101806	64200	66693	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
87		21245	102406	65900	68386	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
88		21359	103006	67600	70079	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
89		21473	103606	69300	71772	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
90		21587	104206	71000	73465	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
91		21701	104806	72700	75158	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
92		21815	105406	74400	76851	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
93		21929	106006	76100	78544	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
94		22043	106606	77800	80237	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
95		22157	107206	79500	81930	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
96		22271	107806	81200	83623	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
97		22385	108406	82900	85316	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
98		22499	109006	84600	87009	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
99		22613	109606	86300	88702	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338
100		22727	110206	88000	90395	15900	13131	12546	19758	09980	45393	66666	12515	90724	98338

Line	Cell	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
101		13284	16924	74151	93027	34670	36665	00770	22474	02179	53304	07270	70517	97275	45460
102		21224	04770	30420	01893	44648	89428	41593	17564	02179	53304	07270	70517	97275	45460
103		99032	47667	81085	01893	64279	80432	65721	83287	34142	13241	20590	97760	35846	91943
104		00199	50993	28603	38452	87890	46244	97721	27186	47501	77638	44236	97814	71131	95419
105		60578	06483	28603	38452	87890	46244	97721	27186	47501	77638	44236	97814	71131	95419
106		91240	18212	17441	01924	18193	69201	31211	54284	32296	37318	65724	90401	74017	92077
107		97458	14229	14263	59611	32244	49266	37489	31924	02581	92446	66445	01912	30446	50813
108		35249	36646	34475	72417	60514	49266	37489	31924	02581	92446	66445	01912	30446	50813
109		38900	46600	11759	11900	56759	77440	89295	27062	97814	13198	59960	68038	89351	37005
110		10750	52745	18749	87365	58959	53731	89295	27062	97814	13198	59960	68038	89351	37005
111		36247	27850	73928	20673	37600	63835	71051	84724	52492	22342	78071	17456	96104	18327
112		70894	66886	99774	72434	01174	40331	11392	22506	55122	65923	70009	23233	65438	59685
113		99638	47702	11443	18148	81386	40331	11392	22506	55122	65923	70009	23233	65438	59685
114		72035	15774	43857	92805	10419	76939	23593	03144	21160	43471	97989	90770	22965	42447
115		24038	65541	85788	55835	38835	59399	13790	35112	01132	43520	76210	22467	83275	32288
116		74976	14632	35908	28221	39470	91548	12854	30166	09073	75887	36782	00268	97121	57676
117		35553	47092	70189	26436	97248	91178	90348	35359	00392	41012	36270	77784	84578	23105
118		35676	12797	51434	82976	42010	92920	90348	35359	00392	41012	36270	77784	84578	23105
119		74815	17523	72985	23183	02446	63594	90924	20633	58842	54644	58581	95331	78629	73344
120		45246	88048	65173	50909	91060	89894	36036	32819	60559	99221	49475	50558	34698	71400
121		76509	47092	86378	41797	11910	49672	88572	97966	32466	10083	54728	41972	58973	30761
122		19863	30752	97515	21358	97248	91178	90348	35359	00392	41012	36270	77784	84578	23105
123		42751	35718	97515	21358	97248	91178	90348	35359	00392	41012	36270	77784	84578	23105
124		11946	48688	20946	11090	48356	57117	83867	86464	14342	21545	46717	72364	86954	55580
125		35726	58643	76869	04622	39098	36883	72505	92265	23107	60278	05822	46760	44294	07672
126		97023	42750	48968	70536	80312	48028	26408	94317	65402	13589	01055	79044	19308	83234
127		37025	66492	56177	04049	80312	48028	26408	94317	65402	13589	01055	79044	19308	83234
128		63814	08075	09788	56350	51591	54509	94619	49295	85830	59860	30883	89604	96142	18354
129		25578	22950	15227	83291	41737	79599	94619	49295	85830	59860	30883	89604	96142	18354
130		68763	58575	88991	49645	46704	43362	56625	00481	73323	91427	15264	06963	77048	54149
131		17900	00815	64361	60725	88974	43036	58254	30660	26451	11520	44323	34778	60342	60388
132		71944	60237	64361	71109	80562	43036	58254	30660	26451	11520	44323	34778	60342	60388
133		54604	62991	85132	64361	80562	43036	58254	30660	26451	11520	44323	34778	60342	60388
134		25578	22950	15227	83291	41737	79599	94619	49295	85830	59860	30883	89604	96142	18354
135		01353	39218	44961	44972	91764	90282	56073	06506	51886	18893	83448	31913	97764	75091
136		99083	88191	27662	99113	91764	90282	56073	06506	51886	18893	83448	31913	97764	75091
137		52021	45404	43774	73225	32325	14281	26317	87779	23783	99226	63488	74904	07322	80380
138		78255	47744	43774	73225	32325	14281	26317	87779	23783	99226	63488	74904	07322	80380
139		28282	68106	59160	16257	28281	43609	12324	25504	89884	31148	58781	14205	34574	70473
140		11959	94202	02143	85847	79726	38191	13988	76847	05320	54236	83891	70224	38632	84776
141		11644	17912	68110	59812	95448	46518	35486	70597	13040	16450	43816	79204	06662	94451
142		06307	97912	68110	59812	95448	46518	35486	70597	13040	16450	43816	79204	06662	94451
143		55328	07598	39608	60866	63007	20007	66819	84164	66131	81429	60676	42807	78286	28015
144		11959	94202	02143	85847	79726	38191	13988	76847	05320	54236	83891	70224	38632	84776
145		78017	90282	90282	22503	83775	26986	74289	30888	84567	29169	72816	33357	15428	86932
146		44768	19336	20696	26331	43340	97744	82261	30888	84567	29169	72816	33357	15428	86932
147		85100	19336	20696	26331	43340	97744	82261	30888	84567	29169	72816	33357	15428	86932
148		02612	46623	62876	85197	07624	91392	50317	37720	06428	42821	10268	20692	13569	29157
149		11317	81666	82861	60413	71020	33658	02411	33322	66036	98712	98712	16308	28413	05417
150		11317	81666	82861	60413	71020	33658	02411	33322	66036	98712	98712	16308	28413	05417

Line	Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
151		38120	51178	75096	13609	16110	73533	43564	59870	35393	67034	81023	93917	51906	89012
152		60924	90455	75234	13609	16110	73533	43564	59870	35393	67034	81023	93917	51906	89012
153		90524	17320	29832	28118	75702	43536	84426	34904	80523	18288	91374	11790	92567	28814
154		18494	18278	67160	12408	65536	59787	47935	59950	98768	13688	92018	93548	92853	95819
155		18494	94209	81060	12408	65536	59787	47935	59950	98768	13688	92018	93548	92853	95819
156		65373	72984	30171	37541	70203	94094	87861	30036	54124	70133	18936	92138	59378	99075
157		40653	12843	64213	70925	98336	50317	74541	61768	52817	81151	38188	11948	54273	49032
158		56338	56338	56338	44587	56338	50317	74541	61768	52817	81151	38188	11948	54273	49032
159		69742	99303	62578	93575	30337	69482	58624	17716	47057	13452	28628	284230	40155	77349
160		58012	74072	67488	74590	47992	69482	58624	17716	47057	13452	28628	284230	40155	77349
161		18348	19855	42887	04279	43206	47077	42637	45606	70011	30662	14642	49984	94509	56380
162		59614	09193	54064	28086	43385	45740	70752	05563	94081	26960	37454	24142	24142	74648
163		75688	28630	39210	58897	62744	98058	98058	67302	72789	01868	11486	14653	87645	89711
164		13941	77802	68101	70061	35460	34576	15412	81302	58757	33488	24870	73531	90603	97702
165		96656	86426	96473	86458	34463	36413	55417	41375	76886	19008	68877	35934	59801	00497
166		03363	82043	15942	14549	38324	77094	19069	67590	11087	98570	22591	65232	85915	91499
167		03366	82043	15942	14549	38324	77094	19069	67590	11087	98570	22591	65232	85915	91499
168		79870	36605	12927	16043	33257	93796	30550	73120	48025	76074	95685	67432	41646	14537
169		79870	36605	12927	16043	33257	93796	30550	73120	48025	76074	95685	67432	41646	14537
170		46967	74841	50923	15339	37755	96995	40162	89561	69199	42827	11647	47603	48779	97907
171		14558	50769	38444	59030	75136	48183	02945	90023	48124	06424	12863	20892	29255	90251
172		12440	25057	01122	28611	13244	10935	10935	10097	48124	06424	12863	20892	29255	90251
173		13293	29938	88523	10497	98529	46587	77702	92113	92113	92113	92113	92113	92113	92113
174		10640	23169	73462	56972	20520	55992	77110	92113	92113	92113	92113	92113	92113	92113
175		97615	23169	35371	56972	20520	55992	77110	92113	92113	92113	92113	92113	92113	92113
176		16948	11128	71624	78754	49084	96303	78730	49084	96303	78730	49084	96303	78730	71474
177		21258	41022	66634	70330	92446	46490	41436	49608	49608	20474	33821	51015	79041	69545
178		15072	48853	15178	47481	71479	63520	63520	35015	49932	20474	33821	51015	79041	69545
179		99154	57418	09858	55671	35426	36666	63520	35015	49932	20474	33821	51015	79041	69545
180		08759	61089	23706	32994	70655	36666	63520	35015	49932	20474	33821	51015	79041	69545
181		73232	57829	61114	22192	47547	58023	64630	34886	98777	73443	35393	96141	45896	73117
182		08258	13986	84824	20764	73206	98583	34548	92343	98583	91803	78893	18952	46436	58794
183		26304	74718	00374	10107	85061	68888	18668	92343	98583	91803	78893	18952	46436	58794
184		12745	58031	35303	04134	35128	44880	12060	42309	46622	55108	84723	92173	90480	11431
185		78934	40886	88282	65788	30300	42323	64088	98373	48971	98049	36534	36534	92834	82118
186		17626	02944	20910	57662	30300	42323	64088	98373	48971	98049	36534	36534	92834	82118
187		27117	61299	50947	41399	81636	16463	15634	98373	48971	98049	36534	36534	92834	82118
188		99995	18678	90018	61642	85701	85269	62363	79717	90394	59240	18210	37989	44606	90946
189		67332	88421	09623	80725	62620	94162	81363	22950	00519	84454	08004	24526	41252	14321
190		94150	12081	37564	88416	21245	93377	50430	82558	58653	98667	78770	94523	45133	18029
191		14455	25383	44538	37033	15575	13245	68808	82558	58653	98667	78770	94523	45133	18029
192		18458	15162	74608	10111	55518	87212	20748	12809	74533	65227	30792	52792	37628	54788
193		89408	15011	46108	76376	25538	87212	20748	12809	74533	65227	30792	52792	37628	54788
194		89408	15011	46108	76376	25538	87212	20748	12809	74533	65227	30792	52792	37628	54788
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197		89408	15011	46108	76376	25538	87212	20748	12809	74533	65227	30792	52792	37628	54788
198		89408	15011	46108	76376	25538	87212	20748	12809	74533	65227	30792	52792	37628	54788
199		89408	15011	46108	76376	25538	87212	20748	12809	74533	65227	30792	52792	37628	54788
200		89408	15011	46108	76376	25538	87212	20748	12809	74533	65227	30792	52792	37628	54788

Line	Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
251		994289	267226	155073	949772	777239	944129	605223	310328	305728	376477	164476	111770	683776	568774
252		434227	254128	155587	812776	444226	173367	229010	310328	305728	376477	164476	111770	683776	568774
253		585775	811238	151846	826776	677639	951337	638430	722260	669938	318116	127759	104337	888437	501115
254		618888	711246	242246	833427	776339	920065	308430	227737	332112	265116	933687	67803	888437	501115
255		73891	47025	40937	711907	26827	96065	308430	227737	332112	265116	933687	67803	888437	501115
256		409338	73894	40884	15997	56293	96033	311736	75068	91314	76293	9498	39388	54837	37203
257		98033	43867	17392	39908	71364	96089	223394	75068	91314	76293	9498	39388	54837	37203
258		59774	29138	46963	39908	99596	95050	25439	04130	46338	17223	3843	82973	37449	35334
259		09765	07548	33043	59782	81449	13652	54480	74460	46707	94303	88117	72446	70995	10742
260		38991	64802	24770	22209	82909	66610	84418	66214	46707	94303	88117	72446	70995	10742
261		26222	27100	56128	62145	82388	45197	97609	03948	01120	71717	38888	58679	97168	08810
262		31864	74120	66831	82306	91784	33177	17681	18963	07216	49288	13185	62797	06723	37025
263		81171	75639	60863	49562	28046	51581	10249	23190	53440	33357	16478	99013	24328	33670
264		60874	58863	23544	51568	53910	44558	42093	22311	57915	13368	13719	13833	30744	56063
265		27848	51107	05761	02159	53911	01952	52973	32230	33647	23508	13073	33061	07773	35047
266		69407	69736	75375	31408	67528	84234	76452	13688	81286	13736	67478	45218	27867	35049
267		89413	03991	06364	13151	43633	43633	79354	16880	84773	25256	32476	60831	50503	34116
268		38228	31231	79415	44358	62490	26936	49682	16307	58535	44822	39374	58487	33020	68881
269		94720	03796	93251	03568	62484	29148	14182	37044	90398	92042	38093	31640	39783	44409
270		45273	16852	08284	41361	73733	61486	33189	08907	41189	08147	18478	33258	17361	79961
271		97260	05528	85686	42915	45847	87401	13339	53850	02431	06602	78387	99708	77863	49884
272		01990	05229	06684	78175	43225	45211	22006	78190	02431	06602	78387	99708	77863	49884
273		24633	42314	74451	50253	57516	59076	62884	63576	40333	29231	13760	73706	69426	01979
274		98071	52677	81128	74451	57516	59076	62884	31412	40333	29231	13760	73706	69426	01979
275		34101	78442	84493	48541	13010	16596	78001	38325	76538	23119	82668	84017	44111	40302
276		77186	93967	85218	66403	73837	73445	86663	18929	88237	85647	18785	70444	58670	35267
277		33114	05481	42338	81396	60823	23680	50453	06489	32227	28589	24136	13126	22099	32388
278		59988	49944	41038	99977	16348	41119	31848	19511	90148	68604	16147	63443	60388	10480
279		11852	42354	26304	99588	75165	30179	94198	33349	33473	29517	80974	69973	37629	38550
280		59992	87922	26329	01709	07003	97507	69260	33349	33473	29517	80974	69973	37629	38550
281		42116	86593	22828	41428	18176	03250	06079	85467	32822	56222	36804	31060	32157	83948
282		39663	61401	21471	68702	50657	53144	21483	25591	57759	51394	95873	09826	61069	78783
283		53348	72009	25826	35397	85484	12577	08635	28879	20480	57309	95582	09826	78783	78783
284		28996	76188	14474	35397	85484	12577	08635	28879	20480	57309	95582	09826	78783	78783
285		31106	26450	14474	35397	85484	12577	08635	28879	20480	57309	95582	09826	78783	78783
286		77133	88224	27845	12024	90587	23726	11812	59414	42185	49234	45560	80447	34324	74896
287		13982	25736	10087	16762	02564	27280	79316	82848	36884	80558	44402	85153	24326	41226
288		26663	36187	11688	28005	46677	53851	75938	73044	05132	18204	98384	90294	95182	36672
289		68572	08275	16313	24936	01680	53829	40412	01479	24241	58488	88341	93314	07135	43446
290		68528	25425	08383	24643	72962	08178	37824	87587	40688	34964	50116	74786	77933	41501
291		97978	44676	08942	47981	51528	71194	48534	16935	85789	95648	03148	10646	18680	86220
292		01214	72824	67828	49985	29179	10385	99514	107557	20284	16736	19918	19669	18483	62538
293		58568	44812	30238	70394	78555	33333	54310	40804	63204	14479	12635	27829	66947	58010
294		54370	31672	03235	49841	44082	69375	34308	08016	25407	94287	12635	27829	66947	58010
295		79934	48681	23881	49841	66084	33477	87968	15639	88406	34128	36064	52118	27102	87334
296		58478	19585	44229	89728	47212	80830	28643	44888	75561	51128	34638	30576	98278	18477
297		28214	79738	62137	78221	47212	74821	28643	44888	75561	51128	34638	30576	98278	18477
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299		28214	79738	62137	78221	47212	74821	28643	44888	75561	51128	34638	30576	98278	18477
300		28214	79738	62137	78221	47212	74821	28643	44888	75561	51128	34638	30576	98278	18477

Line	Col.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
301		64670	102306	82981	56230	71478	08143	48294	42631	43464	58093	14187	13271	98179	87412
302		275771	102307	54984	89406	88122	11470	11775	67324	66371	59949	93949	29949	76456	90068
303		912234	22417	44820	26189	57541	87558	45835	26461	54835	92411	44359	47512	49508	92811
304		751779	64320	71523	67668	38883	09674	27645	76240	47567	01677	38342	88598	12482	30749
305		46654	911085	5818	03513	39273	63384	66677	14148	87552	38383	67435	21072	63864	74644
306		98059	81123	47812	04132	66160	78200	67466	14148	87552	38383	67435	21072	63864	74644
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